Project

Report on existing observation network from all ROOSs

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Contributors : WP 2 partners	
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TABLE OF CONTENTS

I DOCUMENT DESCRIPTION

REFERENCES

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1.0	30.12.2012	All paragraph	Wehde

Diffusion list				
Consortium beneficiaries	X			
Third parties				
Associated Partners				
Other				

II EXECUTIVE SUMMARY

This report provides:

A review of the present status of the observation systems provided by the regional Alliances of the European Global Ocean observing system (EuroGOOS).

The regional systems covered are:

1. Arctic Regional Ocean Observing system (Arctic ROOS)
2. North West European Shelf Operational Oceanography system (NOOS)
3. Baltic Sea Operational Oceanography system (BOOS)
4. Ireland-Biscay-Iberia Regional Operational Oceanography System (IBIROOS)
5. *Mediterranean Operational Network for the Global Ocean System (MONGOOS)*
6. Black Sea Global Ocean Observing System (Black Sea GOOS)

III INTRODUCTION

The European waters are rich in natural resources and contain a large number of diverse marine habitats. The sectors of fisheries & aquaculture, tourism, maritime transport, renewable energy and oil and gas exploitation and increasing human activities (offshore and onshore) are utilizing these resources and climate change impacts form considerable pressures on the marine environment.

The different European regions are characterized by their own specific needs and therefore the monitoring systems aiming for a good overview of the status of the oceans are of very different form, i.e. in the use of measurement methodology in the divers regions of the European waters.

Impact as well from climate change as human activities can have a variety of major implications for marine ecosystems and subsequently for individual marine species. Environmental, social and economic interests often form an area of conflict and sustainable management of marine resources is becoming increasingly important and has been implemented in EU policies and governance strategies such as the Marine Strategy Framework Directive or the Common Fisheries Policy support international activities such as the Global Ocean Observing System and the Global Earth Observation System of System.

However, sustainable management of the marine environment and its resources requires a deep understanding of the physical, biogeochemical, and biological processes, their interaction and synergies and impacts on the marine ecosystem. Only with this understanding it is possible to build predictive ecosystem based management models that are able to combine and integrate the major stressors and their environmental impacts.

The integrative approach to management of the marine ecosystem implies to develop challenging new tools and approaches that deal with the complexity of interactive processes to evaluate trade-offs by simulating scenarios of management plans.

Part of this integrative approach are the observational systems implemented within the EuroGOOS regional alliances for the European waters. Over the last years several European wide projects has been conducted to integrate the in Situ observations towards a system that can serve all the need from the different users. Based on the EuroGOOS ROOSes these different projects such as actual the MyOcean for mostly Realtime data and the SeaDataNet for historical data are complemented by programmes like EMODnet.

The main aim for this report is to provide an overview of the existing observational systems provided by the regional Alliances resp systems that acts as Alliances i.e. the Arctic ROOS, NOOS, BOOS, IBIROOS, MONGOOS and Black Sea GOOS.

IV IN SITU OBSERVING SYSTEMS IN THE ARCTIC ROOS REGION

The Arctic ROOS region covers the high latitudinal Oceans north of 62 N. A group of 16 partners institutes collaborate within the Arctic ROOS community providing operational services and scientific data from the observational system. Overall, the Arctic ROOS area is severely undersampled regarding In Situ observations. A major part of the observatory is conducted in annual or biannual cruises. In addition to servicing the moorings, the cruises are important for obtaining high resolution hydrography both in the horizontal and vertical. Water samples taken on the cruises are providing stable oxygen isotope ratios and nitrate to phosphate ratios are supplementing the permanently installed instrumentation. In addition, work on the sea ice (ice thicknesses, snow depth, radiative properties) supplements the observations made from the upward looking sonars on the moorings.

The real time system providing data is mainly based on drifters and Argo buoys. In Figure 4.1 the status of real time data provided via the MyOcean data delivery is displayed for the month of September 2012. A total number of 98 plattforms are reporting to the Arctic ROOS Real time data delivery system

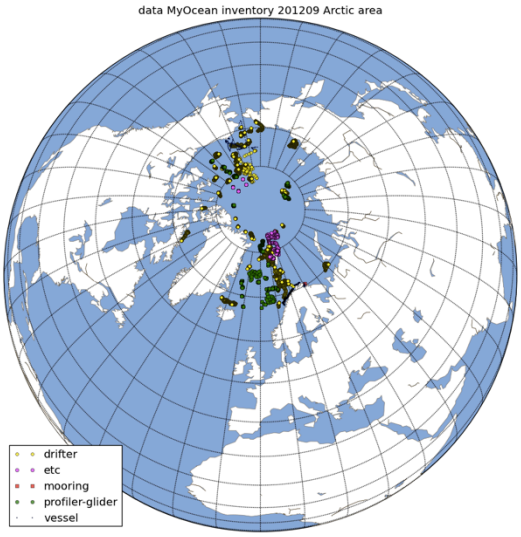

Figure 4.1: Realtime Data provided for the Arctic ROOS region via the EC supported MyOcean project.

The different methodolies used within the the Arctic ROOS region for provision of the Real time data is displayed in Figure 4.2. Here it is obvious that the main methodologies used are the based on the drifter and Argo technology, while only 6 Research Vessels report their data in real time. The list with available stations included in the EMODnet portal is compiled in the Annex

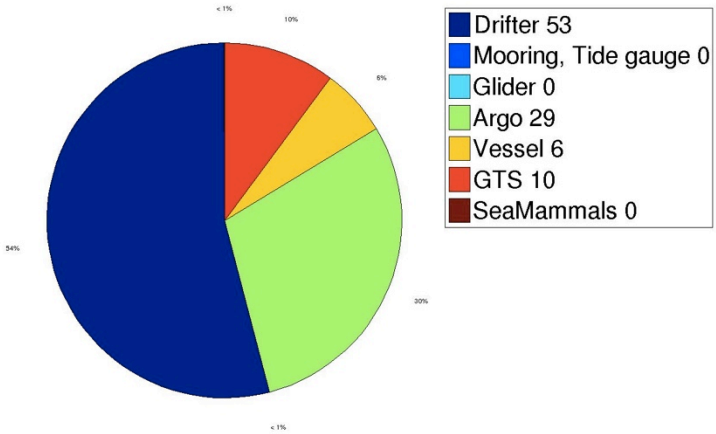

Figure 4.2: Distribution of platform types provided in the MyOcean realtime data delivery: The single platforms are identified by the different categories. In case of the GTS value, the platform provides not sufficient metadata to allocate the measurements to a specific platform

Additionally to the real time observations provided, the Arctic ROOS members conduct a large number of observations that are covering different methodologies:

- Hydrographical surveys using research and monitoring vessels. In addition SOOPs running Ferryboxes are used.
- Moorings in the different straits important for the water exchange between the North Atlantic and the higher lattitudes
- Ice-tethered profile measurements
- Ice breakers and drifting icestations
- Under-ice observations

The Figure 4.3 displays an example of repeated regional survey conducted by IOPAS aiming for information on the status of the ocean by the different countries. Some institutes are conducting such repeated surveys in order to monitor the variability within the Arctic region. Mainly the repetition is limited to specific transects covering crucial areas for the Thermohaline circulation pattern. Figure 4.4 displays the repeated transects conducted since the 1950s undertaken by the IMR. In addition Coastal stations are displayed where profiles were taken in regular frequency since the 1930s. Figure 4.5 displays a set of transects crucial for the estimation of the Volume fluxes caused by the Global thermohaline circulation pattern. Table 4.1 summarises the estimates given for these sections based on the observational efforts undertaken. Figure 4.6 displays the distribution of Ferrybox lines running within the European waters. The Jerico deliverable D 3.1 Report on the current status of Ferrybox ´describes the distribution and installment in detail. Therefor only the specifics are summarized within Table 4.2

In addition to the repeated stations, survey and transects a large number of research and monitoring expeditions are and were conducted during the last decades providing observational data for the Arctic region. An updated T and S climatology will be available via the MyOcean II delivery system for the period 1990-2012 in January 2013.

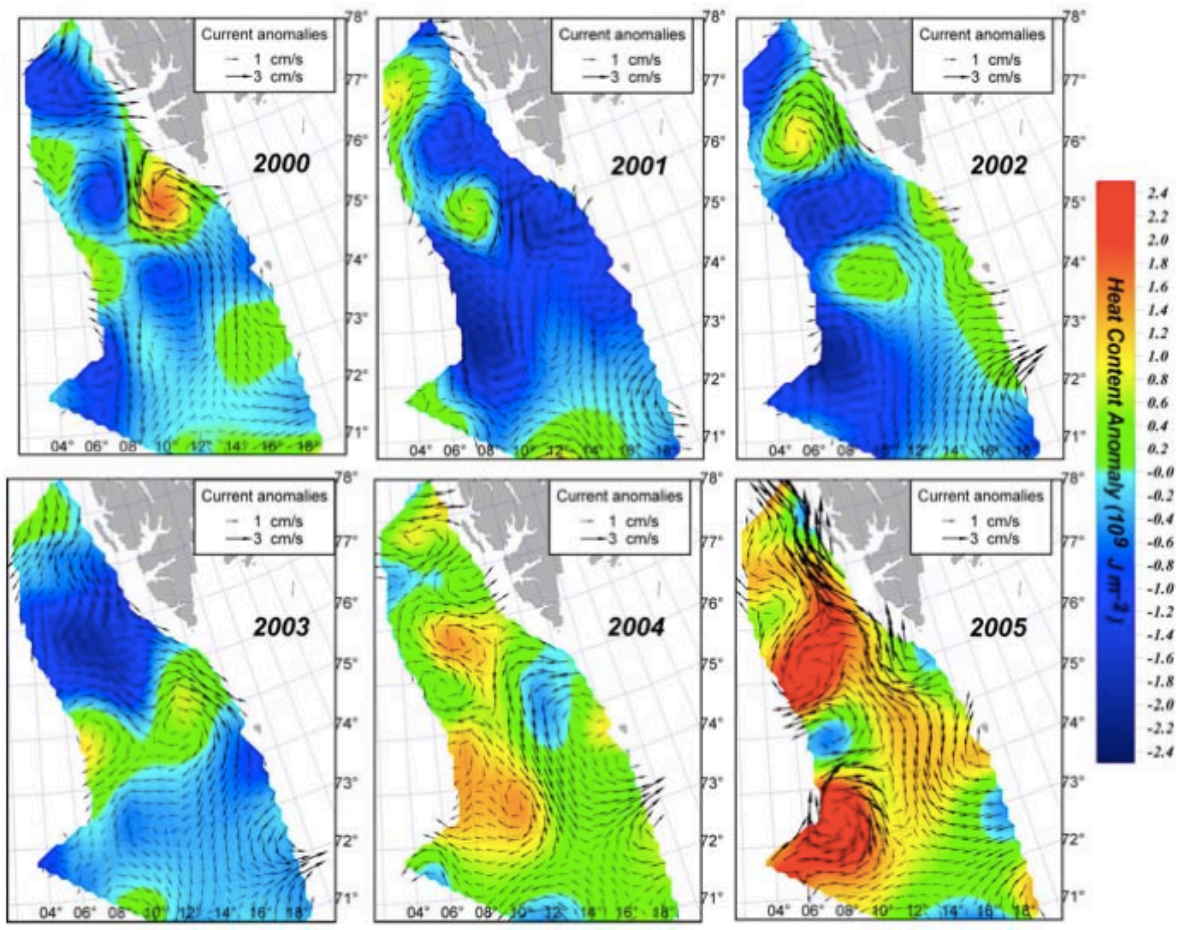

Figure 4.3: Regional survey conducted by the polish Institute IOPAS. Displayed is the heat content and current anomaly for the Barents Sea opening area. The survey is repeated every year and forms a timeseries that contribute to the understanding of the Climate variability

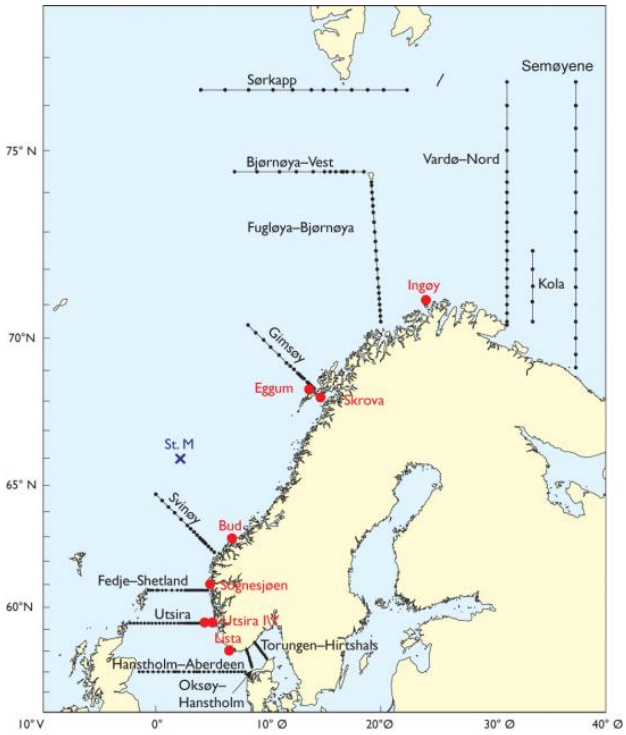

Figure 4.4: Repeated sections aiming for monitoring climate variability within the Norwegian waters. The transects are conducted since the 1950s and 1960s. The red dots display coastal stations established in the 1930s and since then regularly sampled by vertical profiles. The cross marked with StM displays the position of the historical wheathership Mike, which were measurements were undertaken since 1948 and which was removed in 2010. On that position a moored multiparameter buoy is established aiming to continue the valuable data time series.

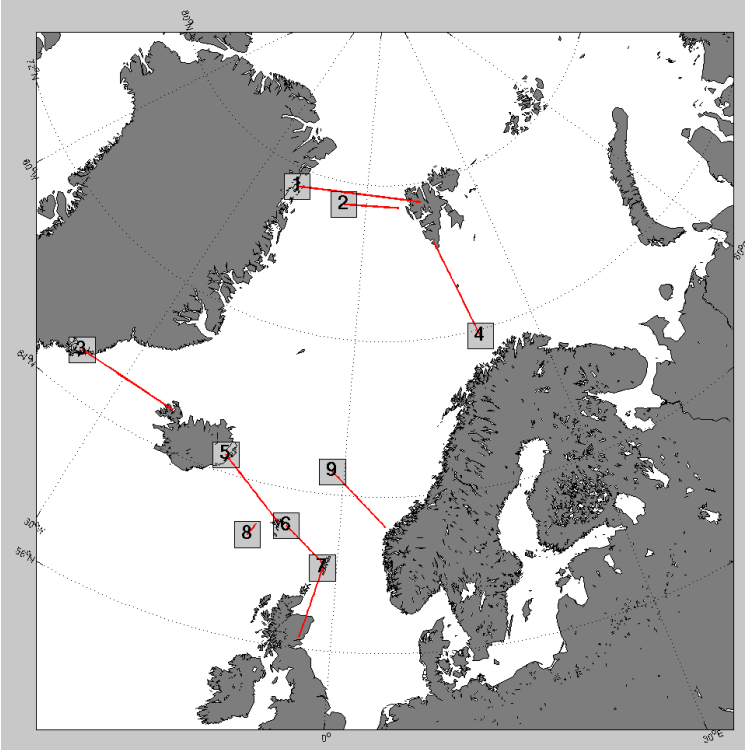

Figure 4.5: Map of the important sections considered in this part of the report. 1-2: Fram Strait. 3: Denmark Strait. 4: Barents Sea Opening. 5: Iceland-Færoes. 6: Færoes-Shetland. 7: Shetland-Scotland. 9: Svinøy section. (Note, Gimsøy is missing)

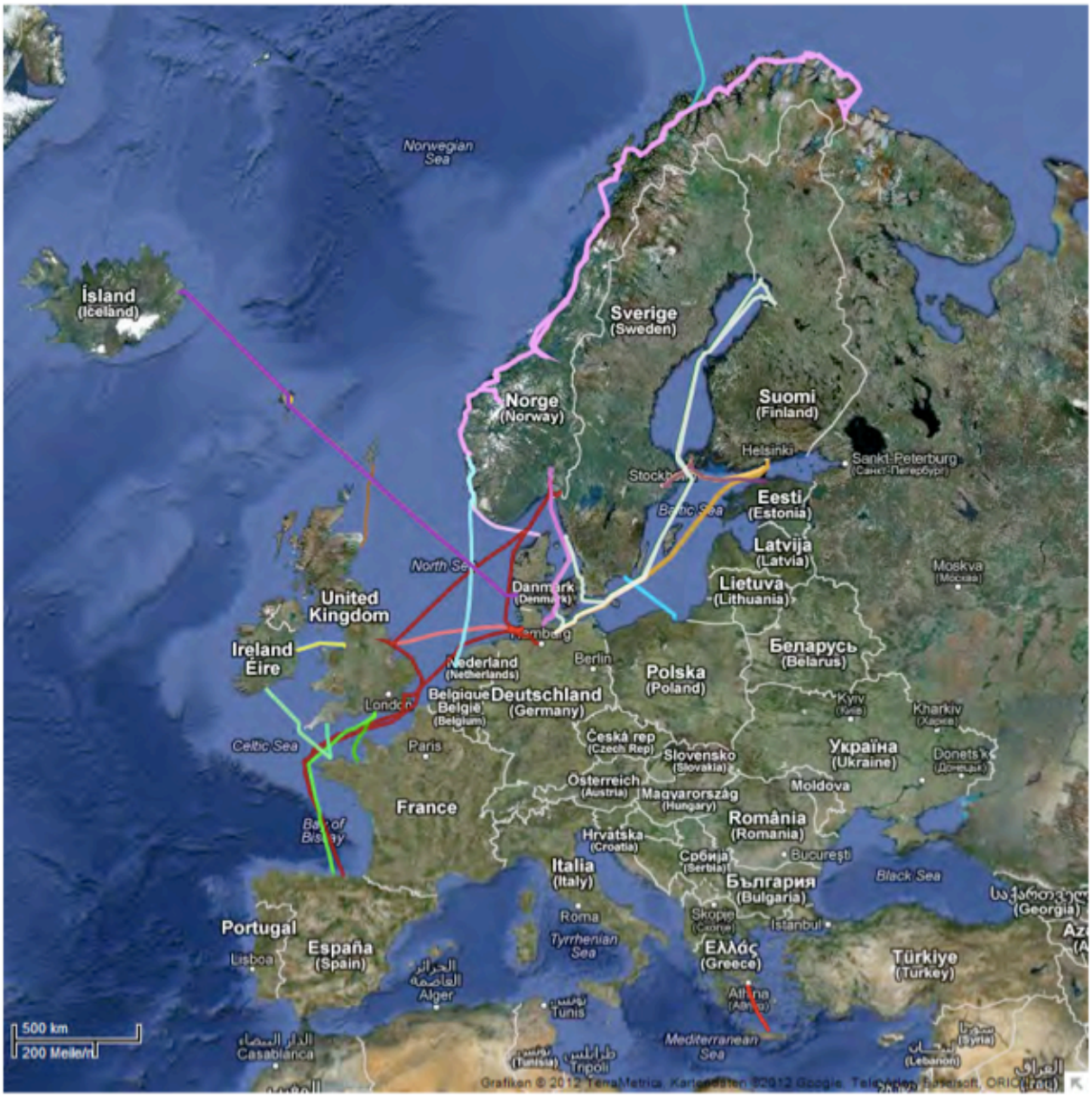

Figure 4.6: Distribution of Ferryboxes running within European waters. Within the Arctic ROOS region there are four Ferryboxes running.

Table 4.1 gives a summary of the observational water transports estimations across the section displayed in Figure 4.5 . Positive transports are defined to the right-hand side of the section. The starting point of the section is indicated by its number. Given are the estimates for observational based estimates. [a]refers to the ACOBAR EU project results (Courtesy A. Beszczynska-Möller, AWI), [b1]to Fram Strait fluxes, [b2] Fram Strait West flux and [b3] to Fram Strait East fluxes all from Mauritzen et al., 2011. [c]to estimates from Hansen et al., 2008, [d] to Hansen and Østerhus 2000,[e] to Skagseth et al., 2008, [f] to Hansen et al., 2010, [g] to Turrell, 1992 and [h] to Hansen and Østerhus 2007.

	Net (Sv)	Pos (Sv)	Neg (Sv)
Fram Strait	2.08[b1]	7.8[b2]	-6.78[b3]
Denmark Strait		6.5[c]	-0.8[c]
		6.0[d]	-1.0[d]
Barents Sea Opening		1.8[e]	
Iceland Faroe		1[f]	-3.8[f]
Faroe-Shetland			-4.03[b4]
Observation			-3.8[c]
Shetland Scotland		0.2[g]	
Svinøy Section	-4.3[e]		
Faroe Bank Channel	2.0[f]		
	2.1[h]		

Table 4.2: Ferrybox lines running in the Arctic ROOS area.

Name of the Ship	**Route**	**Dataprovider**	**Variables covered**
MS Vesterålen	Bergen (N)-Kirkenes (N)	IMR	T, S, Diss Oxygen, Fluorescence
KV TOR	West Coast Norway, Coastwatch ship, no regular route	IMR	T, S, Diss. Oxygen, Fluorescence,
MS Bergensfjord	Bergen(N)-Hirtshals(DK)	NIVA	T,S, Turbidity, Fluorescence, nutrients, Oxygen
MS Trollfjord	Bergen (N)-Kirkenes (N)	NIVA	T, S, Fluorescences, Oxigen, PCO2, Nutrients, irradiance, radiance, wind
MS Norbjørn	Tromsø (N)-Longyearbyen (N)	NIVA	T, S, Fluorescences, Oxigen, PCO2, Nutrients, irradiance, radiance
MS Norønna	Esbjerg (DK)-Seydisfjord (IS)	NIVA Marlab	T, S, Fluorescence

V IN SITU OBSERVING SYSTEMS IN THE NOOS REGION

The NOOS region covers the entire North Sea region and is extended into the North Atlantic Ocean. 24 partner institutes cooperate for the provision of operational Oceanography services within the region. The observational system consists of multiplatform real time observing system that is composed mainly by Drifters, Tidgauges/Moorings and Argo observations.

Ships of Opportunity and some Research vessel activity as well as HF radar systems complementing the real time data delivery system. In Figure 5.1 the status of real time data provided via the MyOcean data delivery system is displayed for the last 30 days at the 30.12.2012. The distribution of observational methodology used for the realtime delivery is displayed in Figure 5.2. The list with available stations included in the EMODnet portal is compiled in the Annex

A temperature salinity climatology for the 1990-actual period will be available from January 2013.

A total number of 336 plattforms is reporting to the NOOS region Realtime data delivery system.

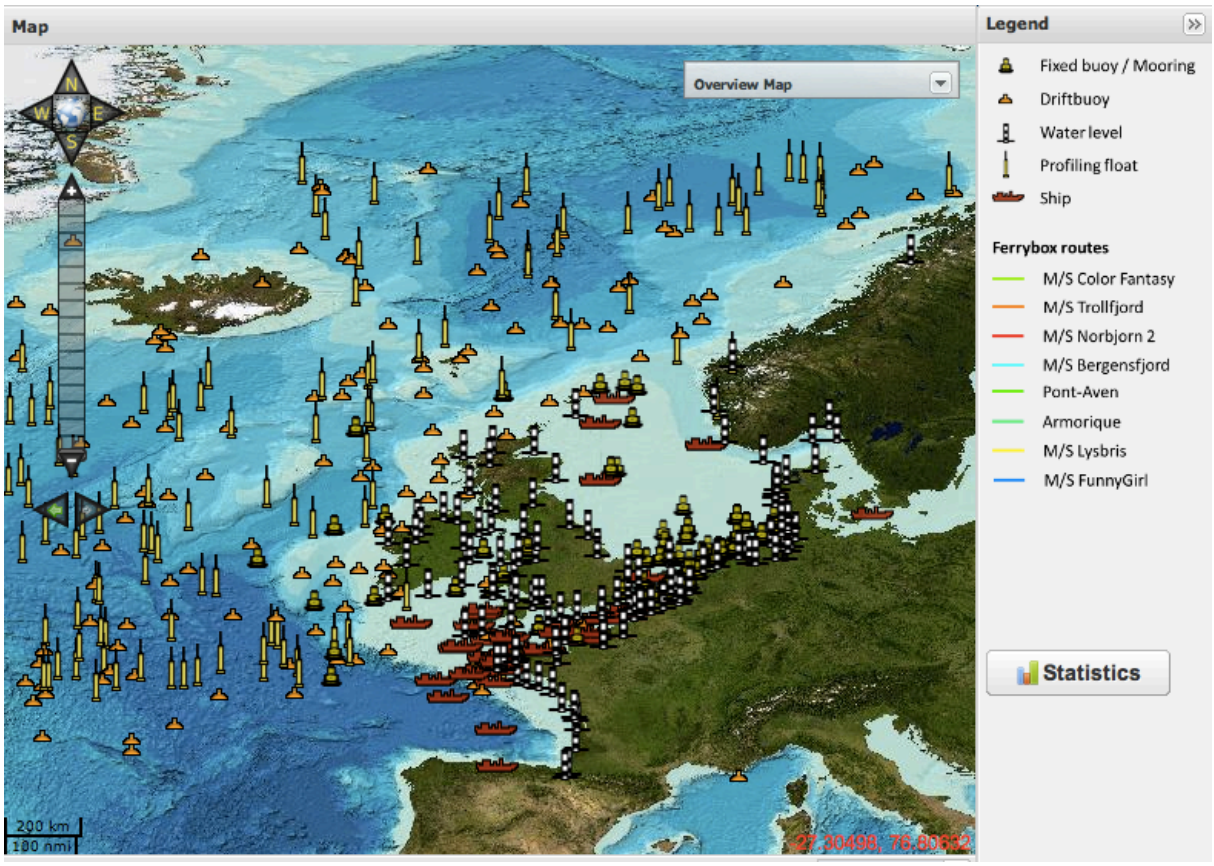

Figure 5.1: Realtime Data provided for the NOOS region. Displayed are the position of data points for the last month for December 2012.

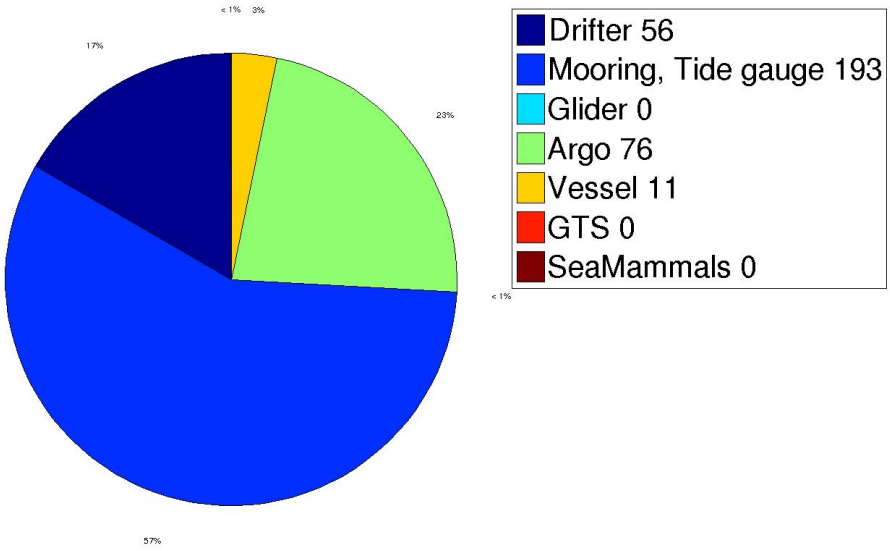

Figure 5.2: Distribution of platform types provided in the MyOcean realtime data delivery

The NOOS community provides information on additional variables via the NOOS web portal. In Figure 5.3 the position of the data sources for real time river discharge data is displayed for the NOOS region.

Waves data information is also provided as real time service for use. The position of the Wavedata observational devices available in the NOOS portal is displayed in Figure 5.4. The online display of the actual status of the provided Sealevel data is shown in Figure 5.5.

The weekly blended Sea Surface Temperature map based on InSitu measurements by Research vessels and SOOPs is provided by the portal Figure 5.6 displays the actual status provided at the 18. of December 2012. Figure 5.7 displays the distribution of Ferrybox lines running within the European waters. The Jerico deliverable D 3.1 Report on the current status of Ferrybox ´describes the distribution and installment in detail. Therefor only the specifics are summarized within Table 5.1

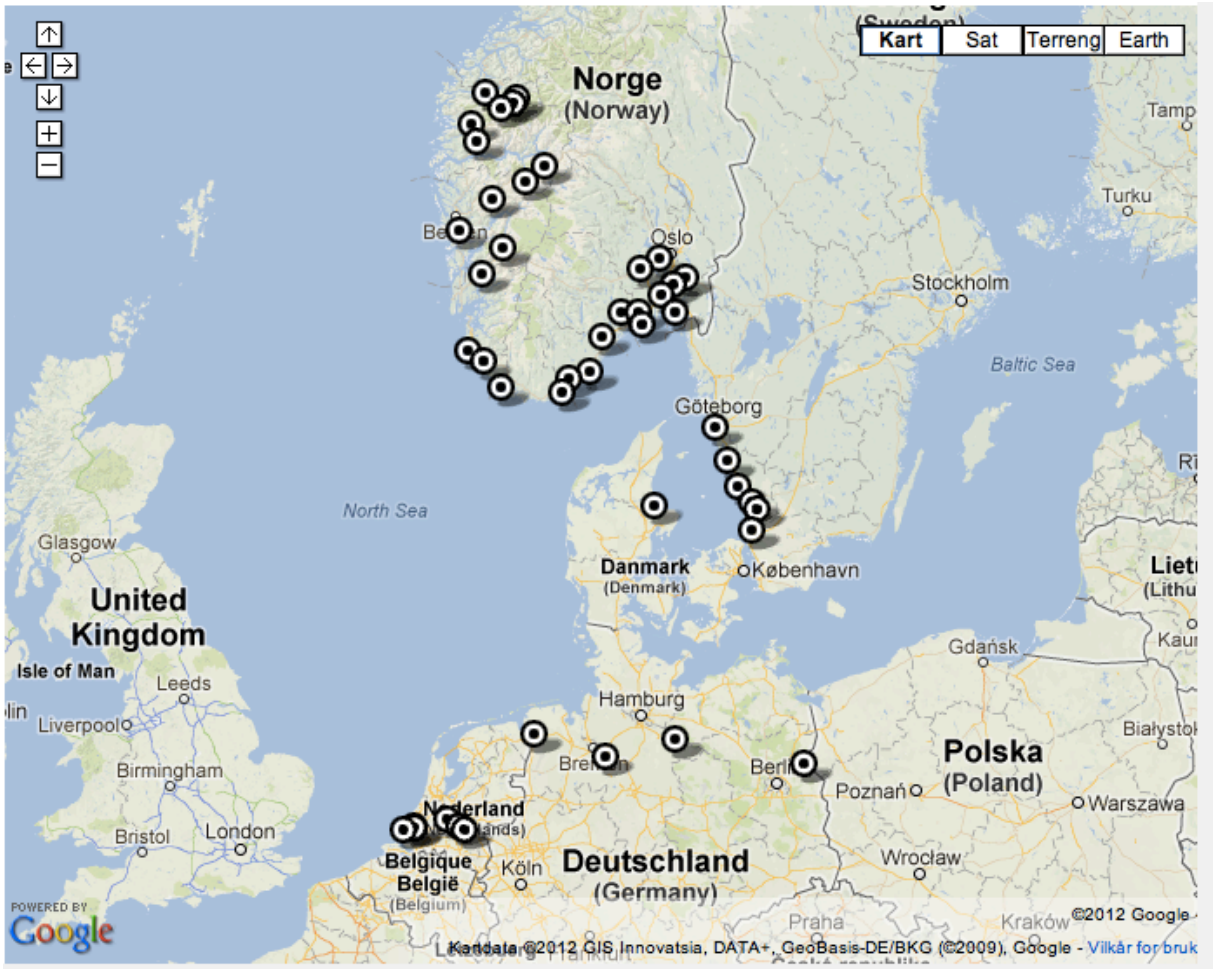

Figure 5.3: Real time discharges provided by the NOOS portal

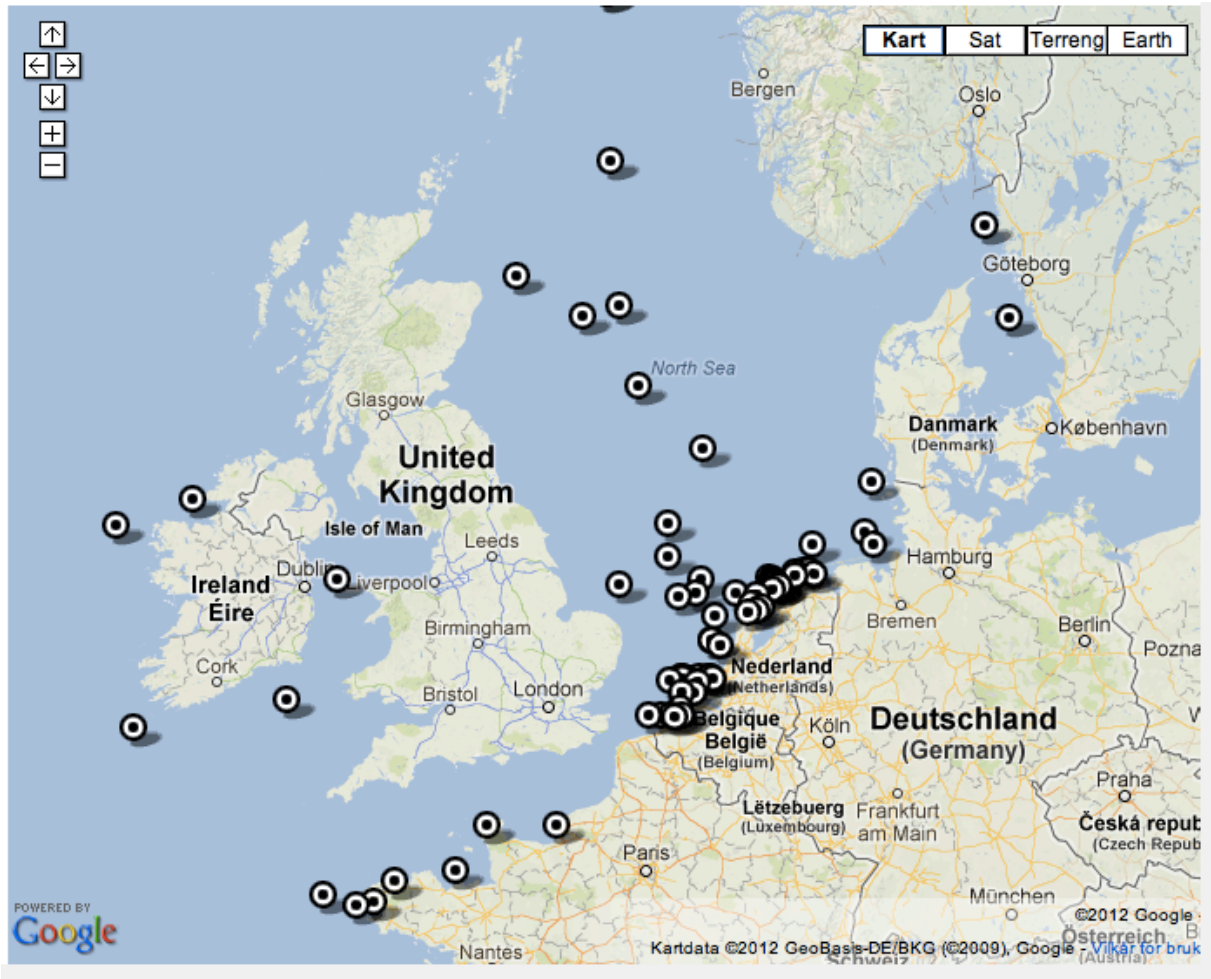

Figure 5.4: Real time delivery of Wave observations provided by the NOOS portal

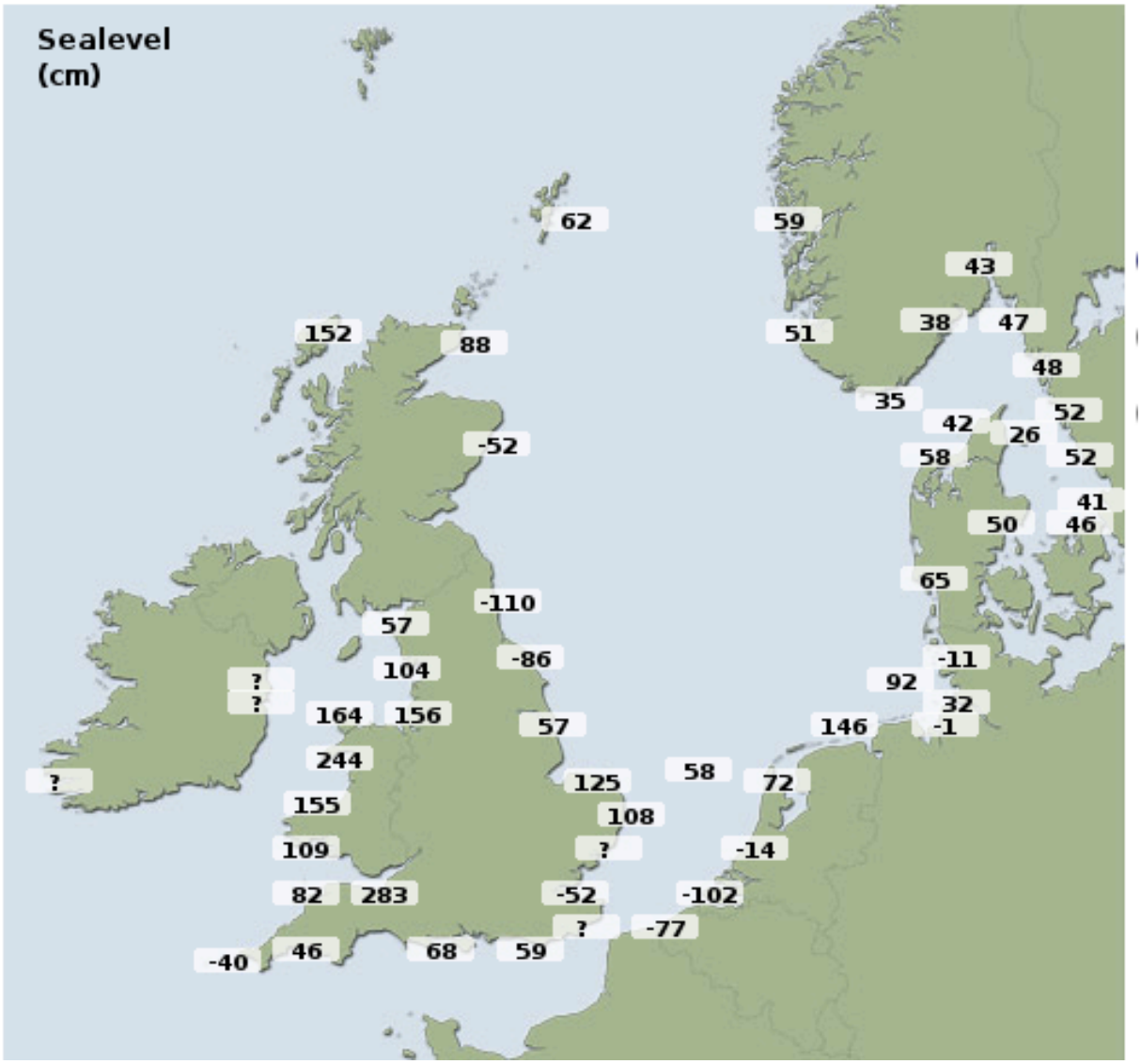

Figure 5.5: The actual status of the Sealevel distribution at the 30.12.2012 displayed at the NOOS portal provided by the real time observational network

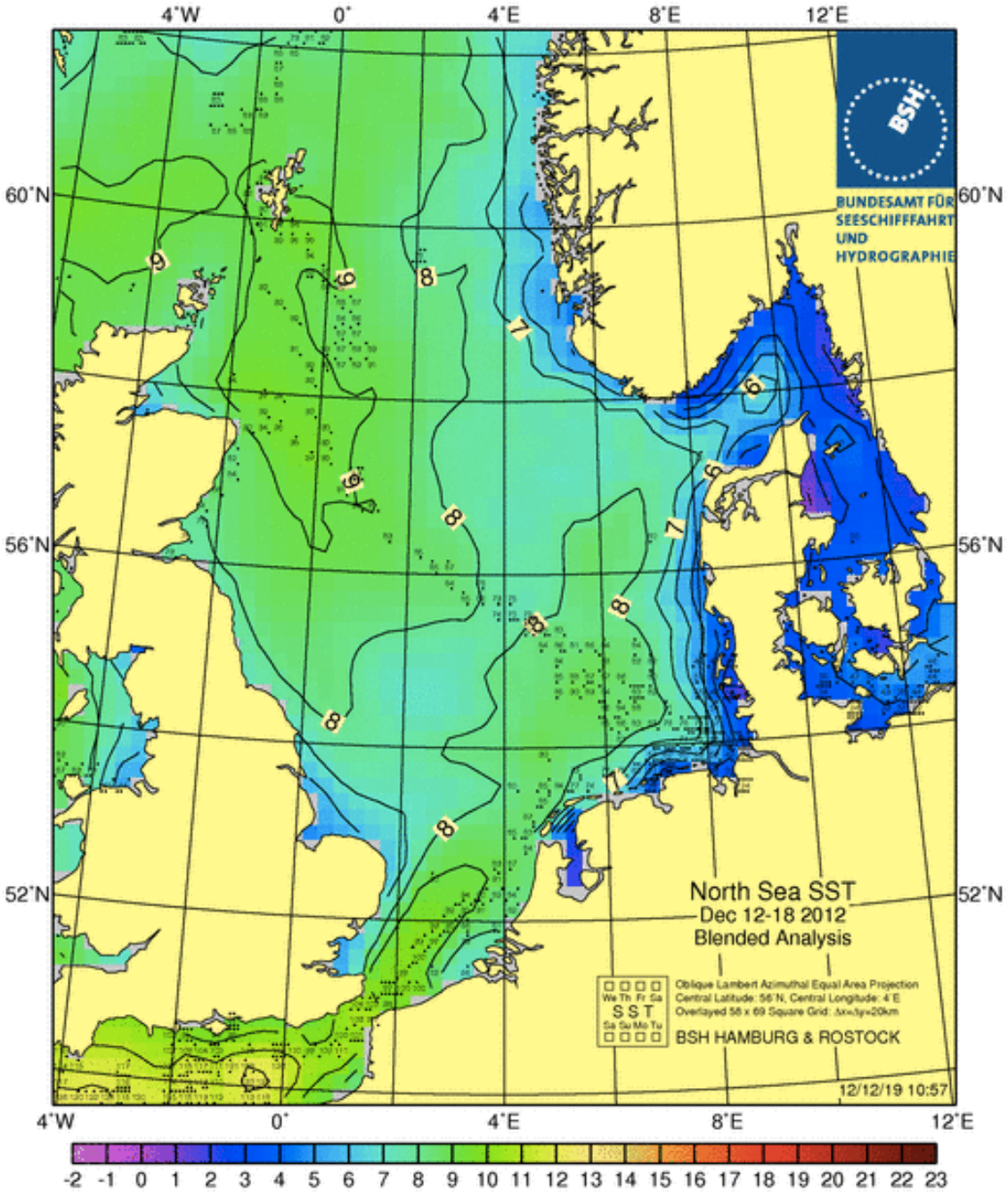

Figure 5.6: The weekly blended Sea Surface Temperature map based on InSitu measurements by Research vessels and SOOPs

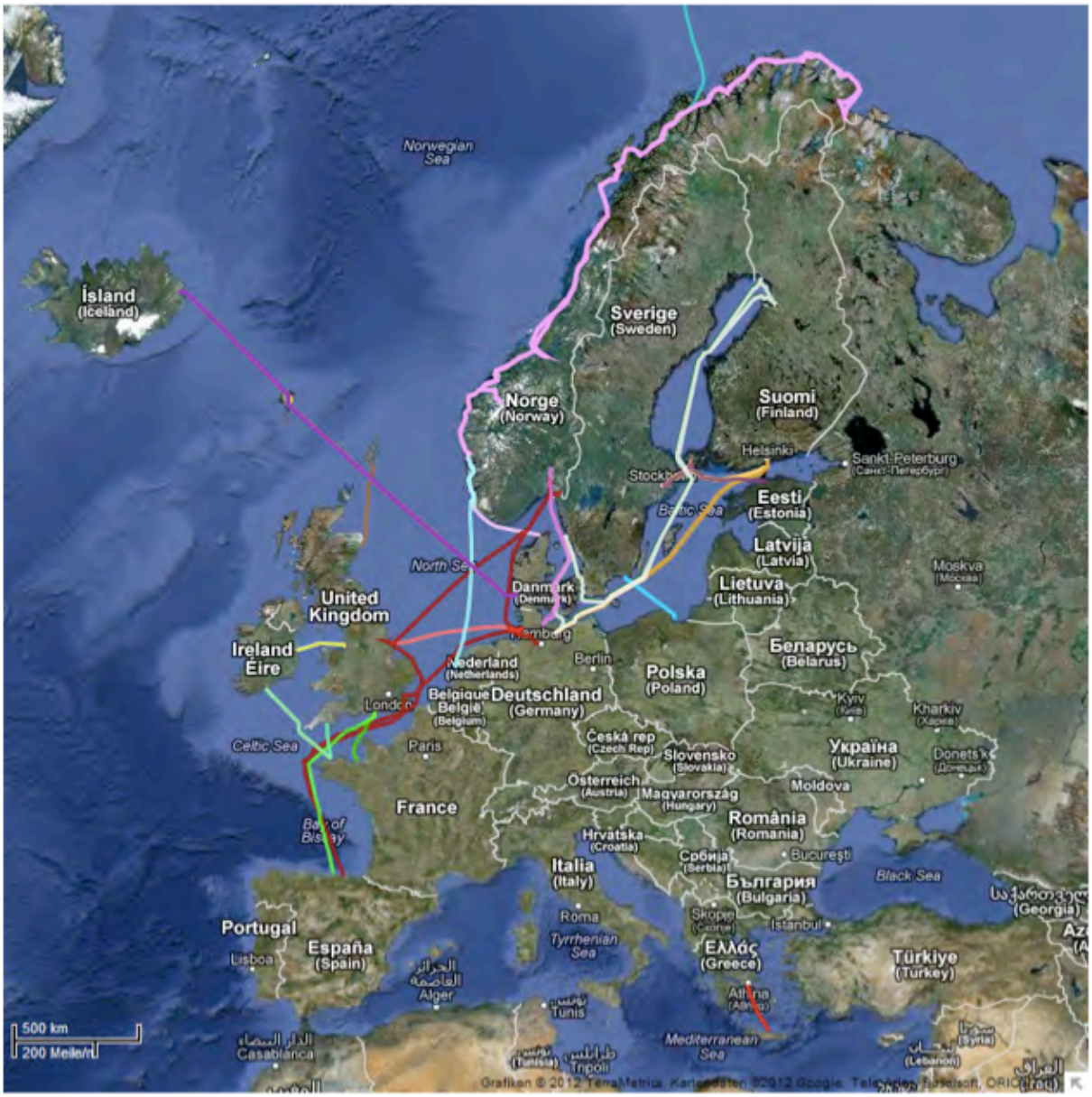

Figure 5.7: Distribution of Ferryboxes running within European waters. Within the NOOS region there are seven Ferryboxes running, additionally historical data is available from two ferryboxes. Figure taken from Jerico deliverable D 3.1 Report on the current status of Ferrybox ´

Table 5.1: Ferrybox lines running in the NOOS area.

Name of the Ship	**Route**	**Dataprovider**	**Variables covered**
MS Trans Carrier	Bergen (N)-Amsterdam (NL)	BCCR, UIB	PCO2,T,S, Turbidity,pH, Fluorescence
Dutchess of Scandinavia Stopped service	Cuxhaven-Harwich	HZG	T, S, Diss. Oxygen, Fluorescence,
Tor Dania Stopped service	Bergen(N)-Hirtshals(DK)	HZG	T,S, Turbidity, Fluorescence, nutrients, Oxygen
Lysbris	Moss (N)-Cuxhaven(G)-Chatham(GB)- Bilbao (S)- Immingham	HZG	T, S, Diss Oxygen, Fluorescence, pH, Turbidity, nutrients
MS FunnyGirl	Cuxhaven (G) - Helgoland(G)-Buesum(G)	HZG	T, S, Fluorescences, Oxigen, PCO2, Nutrients, irradiance, radiance
MS Norønna	Esbjerg (DK)-Seydisfjord (IS)	NIVA Marlab	T, S, Fluorescence
NIOLON	Marseille Algier	IFREMER	T,S
Pont Aven	Portsmouth(GB)-Santander(S)- Roscoff (F)- Cork (I)	IFREMER	T, S, Diss. Oxygen, Fluorescence, Turbidity, CDOM
MS Bergensfjord	Bergen(N)-Hirtshals(DK)	NIVA	T,S, Turbidity, Fluorescence, nutrients, Oxygen

VI IN SITU OBSERVING SYSTEMS IN THE BOOS REGION

The BOOS region covers the entire Baltic Sea region. 20 partner institutes cooperate for the provision of operational Oceanography services within the region. The observational system consists mainly of tide gauges and moored buoys/fixed platforms providing real time observations. Ships of Opportunity and some Research vessel activity complementing the real time data delivery system. In Figure 6.1 the status of real time data provided via the MyOcean data delivery system is displayed for the month of September 2012. The distribution of observational methodology used for the realtime delivery is displayed in Figure 6.2. It is obvious that the BOOS real time observational system is mainly based on Tide gauges and moored systems/buoys, a consequence of the deep financial crisis in the Balticum within the 1990´s which was followed by a large reduction of Vessel based observational efforts. The list with available stations included in the EMODnet portal is compiled in the Annex

A total number of 102 platforms is actually reporting to the BOOS region Realtime data delivery system.

A temperature salinity climatology for the 1990-actual period will be available from January 2013.

Figure 6.1: Realtime Data provided for the BOOS region

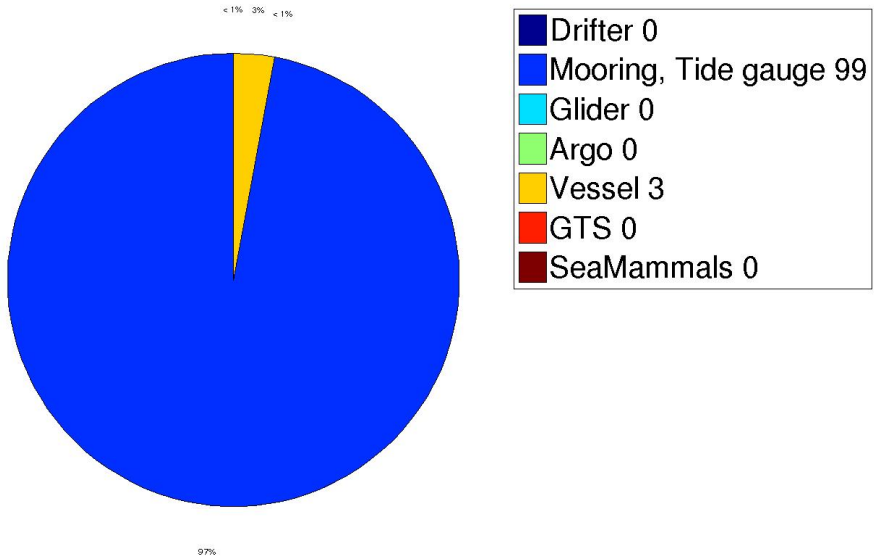

Figure 6.2: Distribution of platform types provided in the MyOcean realtime data delivery: The single platforms are identified by the different categories. In case of the GTS value, the platform provides not sufficient metadata to allocate the measurements to a specific platform

In addition to these data in real time mode, the BOOS observational system provides updated ice charts for the Baltic Sea (see Figure 6.3) and gives maps on algal blooms in the different regions within the Baltic Sea. An example of such a map is displayed in Figure 6.4. The online display of the actual status of the provided Sealevel data is shown in Figure 6.5. Figure 6.6 displays the distribution of Ferrybox lines running within the European waters. The Jerico deliverable D 3.1 Report on the current status of Ferrybox ´describes the distribution and installment in detail. Therefor only the specifics are summarized within Table 6.1

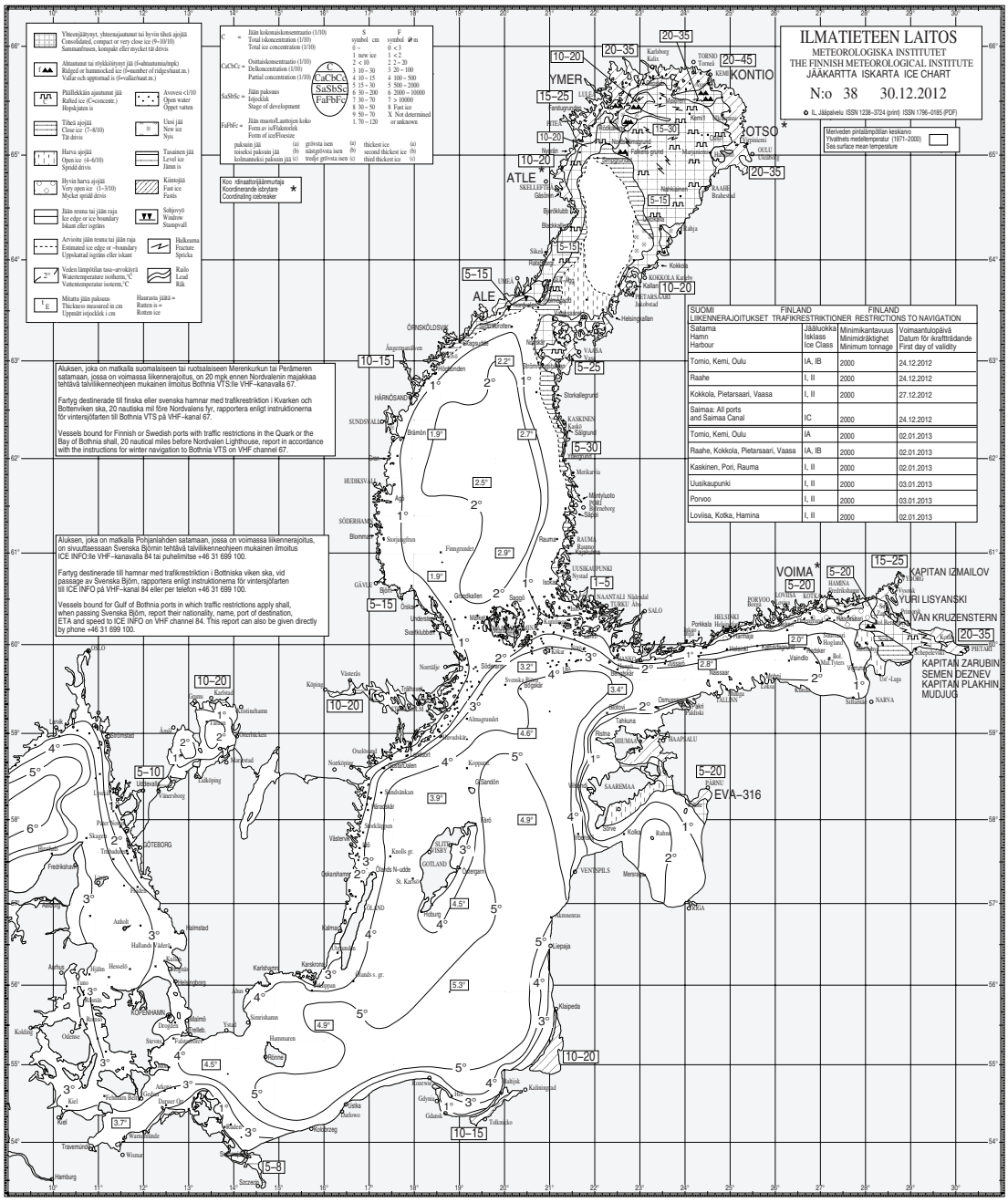
ILMATIETEEN LAITOS
METEOROLOGISKA INSTITUTET
THE FINNISH METEOROLOGICAL INSTITUTE
JÄÄKARTTA ISKARTA ICE CHART
N:o 38 30.12.2012
YMER
KONTIO
OTSO
ATLE
ALE
VOIMA
EVA-316
KAPITAN IZMAILOV
YURI LISYANSKI
IVAN KRUZENSTERN
KAPITAN ZARUBIN
SEMEN DEZNEV
KAPITAN PLAKHIN
MUDJUG
SUOMI FINLAND FINLAND
LIIKENNERAJOITUKSET TRAFIKRESTRIKTIONER RESTRICTIONS TO NAVIGATION
Satama Hamn Harbour
Jääluokka Isklass Ice Class
Minimikantavuus Minimidräktighet Minimum tonnage
Voimaantulopäivä Datum för ikraftträdande First day of validity
Tornio, Kemi, Oulu IA, IB 2000 24.12.2012
Raahe I, II 2000 24.12.2012
Kokkola, Pietarsaari, Vaasa I, II 2000 27.12.2012
Saimaa: All ports and Saimaa Canal IC 2000 24.12.2012
Tornio, Kemi, Oulu IA 2000 02.01.2013
Raahe, Kokkola, Pietarsaari, Vaasa IA, IB 2000 02.01.2013
Kaskinen, Pori, Rauma I, II 2000 02.01.2013
Uusikaupunki I, II 2000 03.01.2013
Porvoo I, II 2000 03.01.2013
Loviisa, Kotka, Hamina I, II 2000 02.01.2013
Aluksen, joka on matkalla suomalaiseen tai ruotsalaiseen Merenkurkun tai Perämeren satamaan, jossa on voimassa liikennerajoitus, on 20 mpk ennen Nordvalenin majakkaa tehtävä talviliikennevaroitus mukainen ilmoitus Bothnia VTS:lle VHF–kanavalla 67.
Fartyg destinerade till finska eller svenska hamnar med trafikrestriktion i Kvarken och Bottenviken ska, 20 nautiska mil före Nordvalens fyr, rapportera enligt instruktionerna för vintersjöfarten till Bothnia VTS på VHF–kanal 67.
Vessels bound for Finnish or Swedish ports with traffic restrictions in the Quark or the Bay of Bothnia shall, 20 nautical miles before Nordvalen Lighthouse, report in accordance with the instructions for winter navigation to Bothnia VTS on VHF channel 67.
Aluksen, joka on matkalla Pohjanlahden satamaan, jossa on voimassa liikennerajoitus, on sivuuttaessaan Svenska Björnin tehtävä talviliikennehoyheen mukainen ilmoitus ICE INFO:lle VHF–kanavalla 84 tai puhelimitse +46 31 699 100.
Fartyg destinerade till hamnar med trafikrestriktion i Bottniska viken ska, vid passage av Svenska Björn, rapportera enligt instruktionerna för vintersjöfarten till ICE INFO på VHF–kanal 84 eller per telefon +46 31 699 100.
Vessels bound for Gulf of Bothnia ports in which traffic restrictions apply shall, when passing Svenska Björn, report their nationality, name, port of destination, ETA and speed to ICE INFO on VHF channel 84. This report can also be given directly by phone +46 31 699 100.
Meriveden pintalämpötilan keskiarvo
Ytvattnets medeltemperatur (1971–2000)
Sea surface mean temperature
IL, Jääpalvelu ISSN 1238–3724 (print) ISSN 1796–0185 (PDF)

Figure 6.3: Ice chart for the BOOS region provided on the BOOS portal at the 30.12.2012.

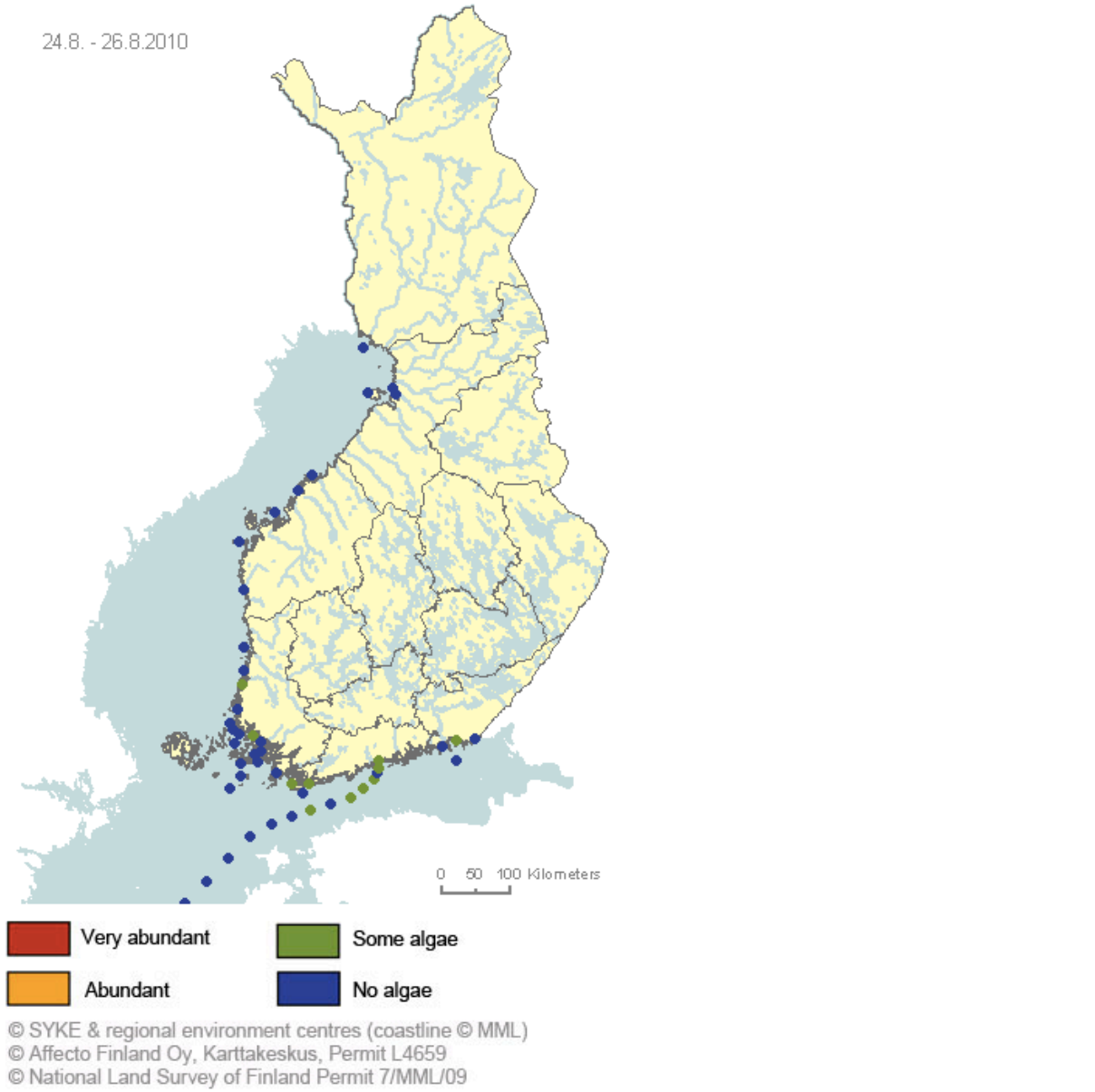

Figure 6.4: Algal bloom map displayed for the Finnish Sea area. As an example data from the 26th of August 2010 are displayed.

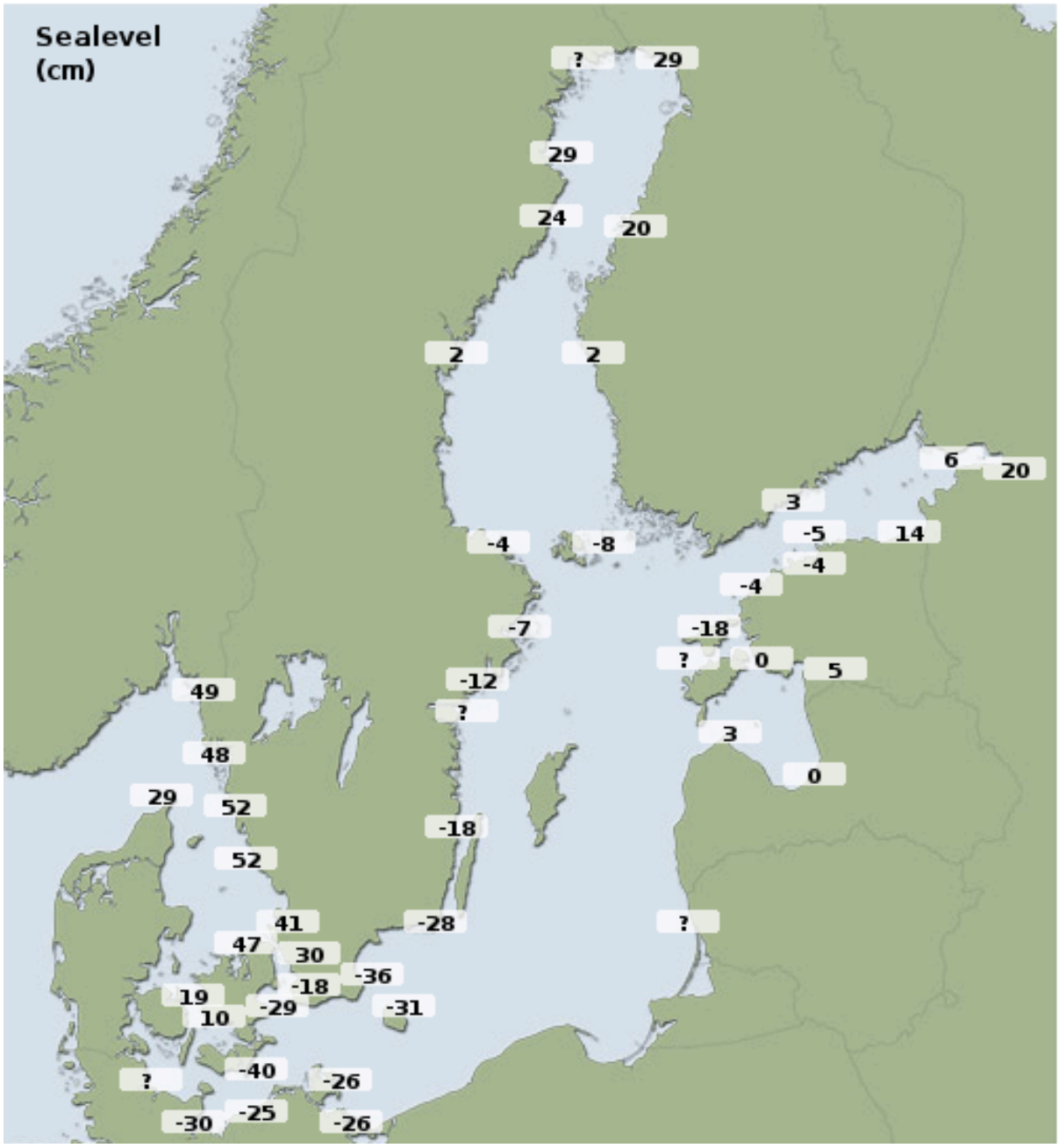

Figure 6.5: The actual status of the Sealevel distribution at the 30.12.2012 displayed at the BOOS portal provided by the real time observational network

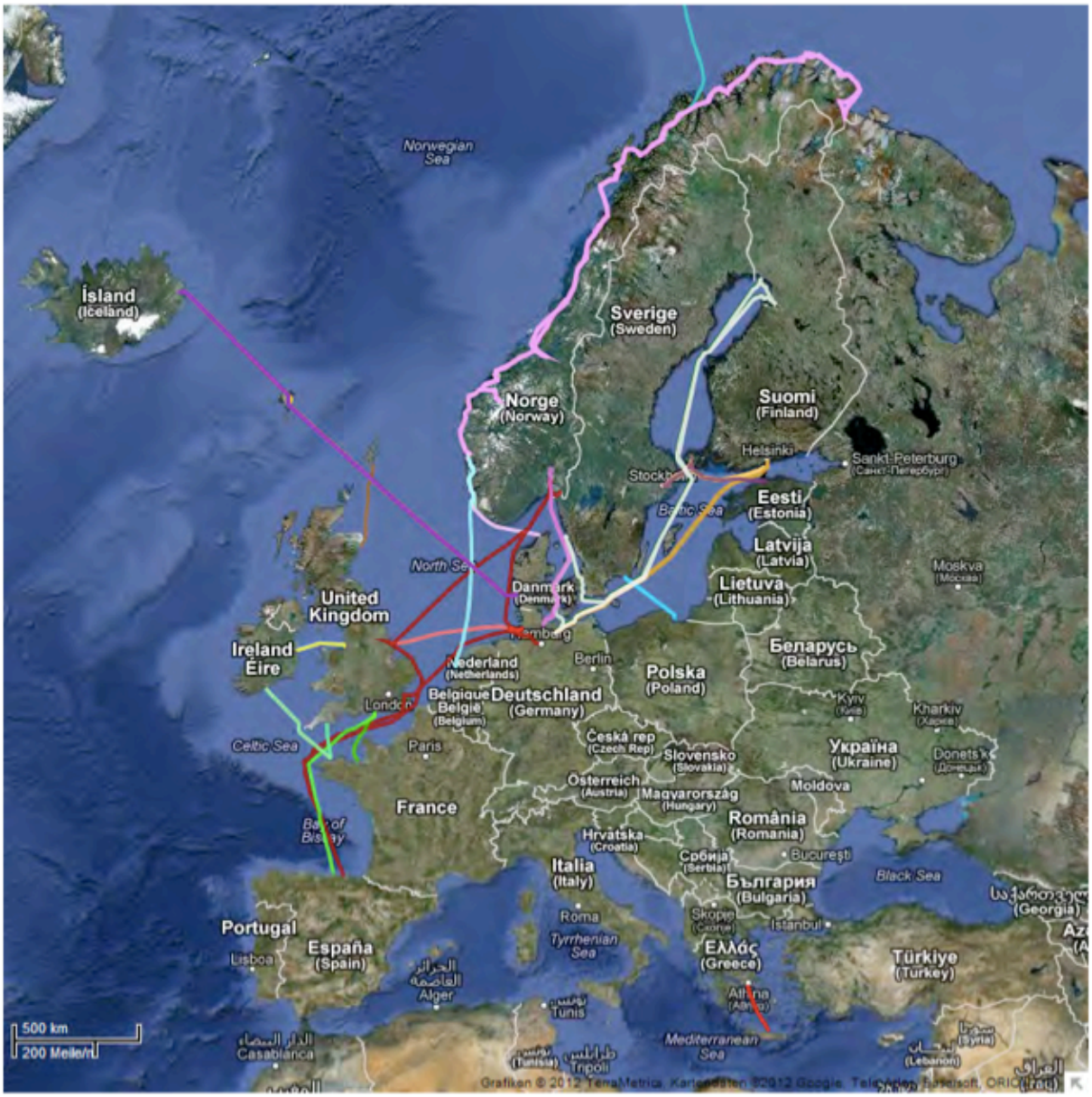

Figure 6.6: Distribution of Ferryboxes running within European waters. Within the BOOS region there are six Ferryboxes running. Figure taken from Jerico deliverable D 3.1 Report on the current status of Ferrybox ´

Table 6.1: Ferrybox lines running in the BOOS area.

Name of the Ship	**Route**	**Dataprovider**	**Variables covered**
Stena Baltica	Gdynia (PL) - Karlskrona (S)	IMGW	T, S, Turbidity, Diss Oxygen, Fluorescence
MS Romantica	Tallinn(ES)- Stockholm (S)	LOMI	T, S, Turbidity, Fluorescence,
MS Colour Fantasy	Oslo (N)-Kiel (G)	NIVA	T,S,CDOM, cyanob., Turbidity,Fluorescence, nutrients, Oxygen, irradiance
TRANSPAPER	Gothenburg-Kemi-Oulu_Luebeck	SMHI+SYKE	T, S, Turbidity, Fluorescences,CDOM Phycocyanin, Oxygen, PAR, airpress, airtemp,
Silja Serenade	Helsinki-Stockholm	SYKE	T,S,Fluorescences, Phycocyan, nutrienst, phytoplankton
MS Baltic Princess	Tallinn- Helsinki	TTU	T,S,Fluorescence, phycocyan, nutrients

VII IN SITU OBSERVING SYSTEMS IN THE IBIROOS REGION

The IBIOOS region covers the Irish Sea and the Biscay as well as the Iberian region. 17 partners cooperate for the provision of operational Oceanography services within the region. The observational system consists of multiplatform real time observing system that is composed mainly by Drifters, Tidgauges/Moorings and Argo observations. A number of 9 Vessels is delivering data in real time mode.

Observations provided by Ferryboxes, Gliders and Fishing vessels as well as now 7 HF radar systems are complementing the observational program. In Figure 7.1 the status of real time data provided via the MyOcean data delivery system is displayed for the month of September 2012. The distribution of observational methodology used for the realtime delivery is displayed in Figure 7.2. The list with available stations included in the EMODnet portal is compiled in the Annex

A total number of 476 platforms is actually reporting to the IBIROOS region Realtime data delivery system.

A temperature salinity climatology for the 1990-actual period will be available from January 2013.

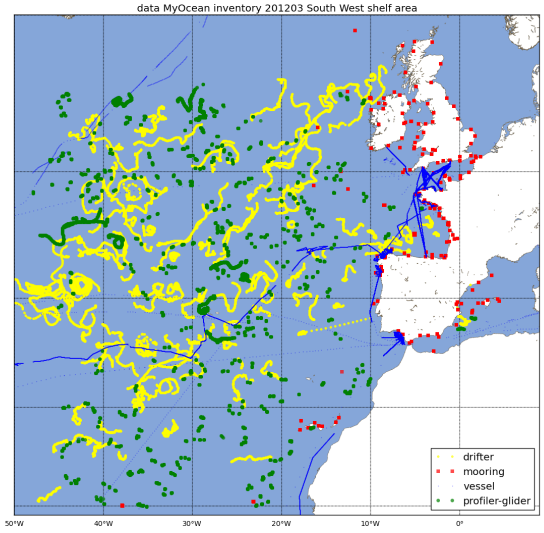

Figure 7.1: Realtime Data provided for the IBIROOS region

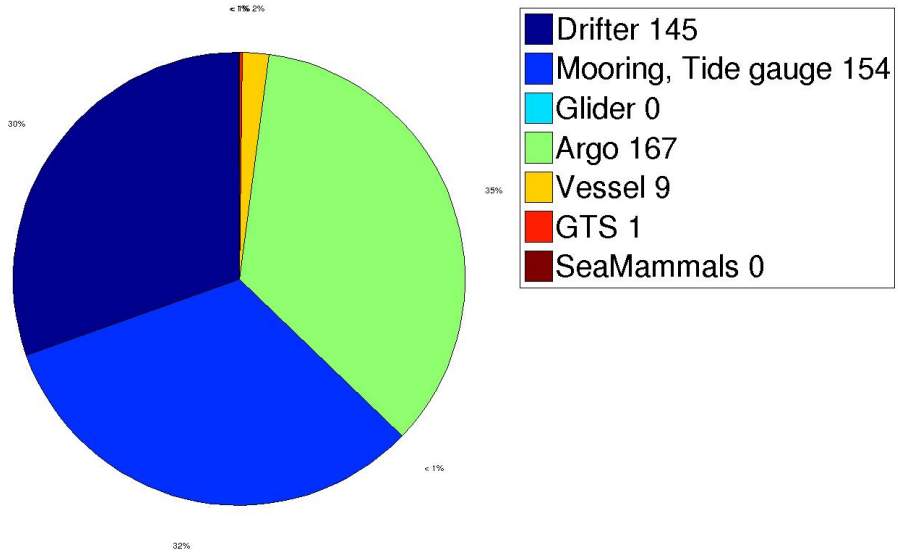

Figure 7.2: Distribution of platform types provided in the MyOcean realtime data delivery: The single platforms are identified by the different categories. In case of the GTS value, the platform provides not sufficient metadata to allocate the measurements to a specific platform.

Figure 7.3 shows the immediate position of the data platforms that are providing data to the IBIROOS region. These platforms providing mostly physical parameters/variables such as temperature, salinity, currents and Sealevel. For the biogeochemical parameters the delivery in near real time is limited by the contribution of the Ferrybox component. The actual status for the real time delivery of data is summarized within Table 7.1. An additional focal point is laid on the provision of River runoff data. Here the data provision from the GRDC (Global Runoff Data Centre, http://grdc.bafg.de) data base is complemented by efforts undertaken within the IBIROOS area. Figure 7.4 displays the improvement provided in relation to the GRDC database.

Figure 7.5 displays the distribution of Ferrybox lines running within the European waters. The Jerico deliverable D 3.1 Report on the current status of Ferrybox ´describes the distribution and installment in detail. Therefor only the specifics are summarized within Table 7.2

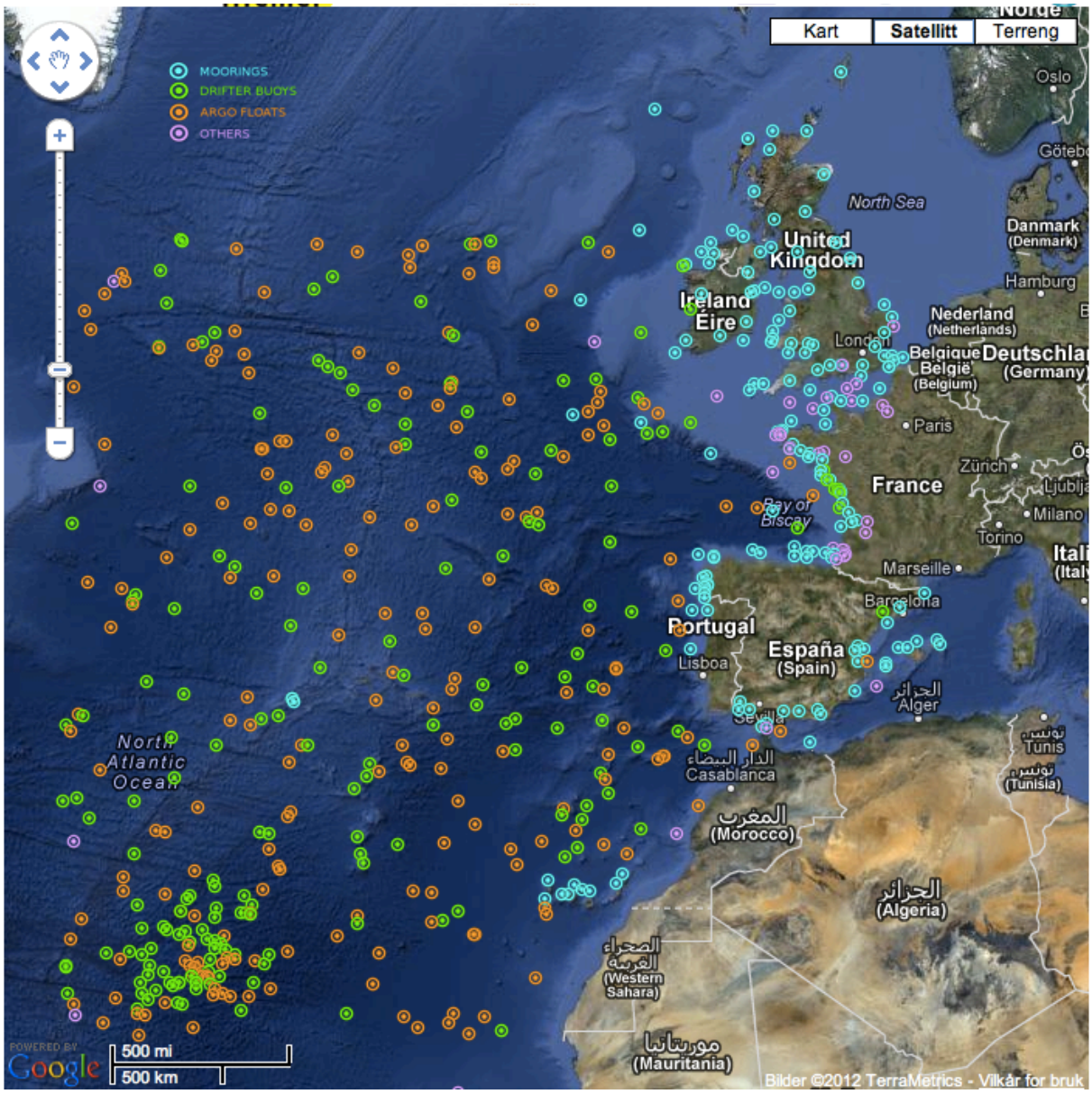

Figure 7.3: Location of latest position of measurements provided to the IBIROOS observational data platform.

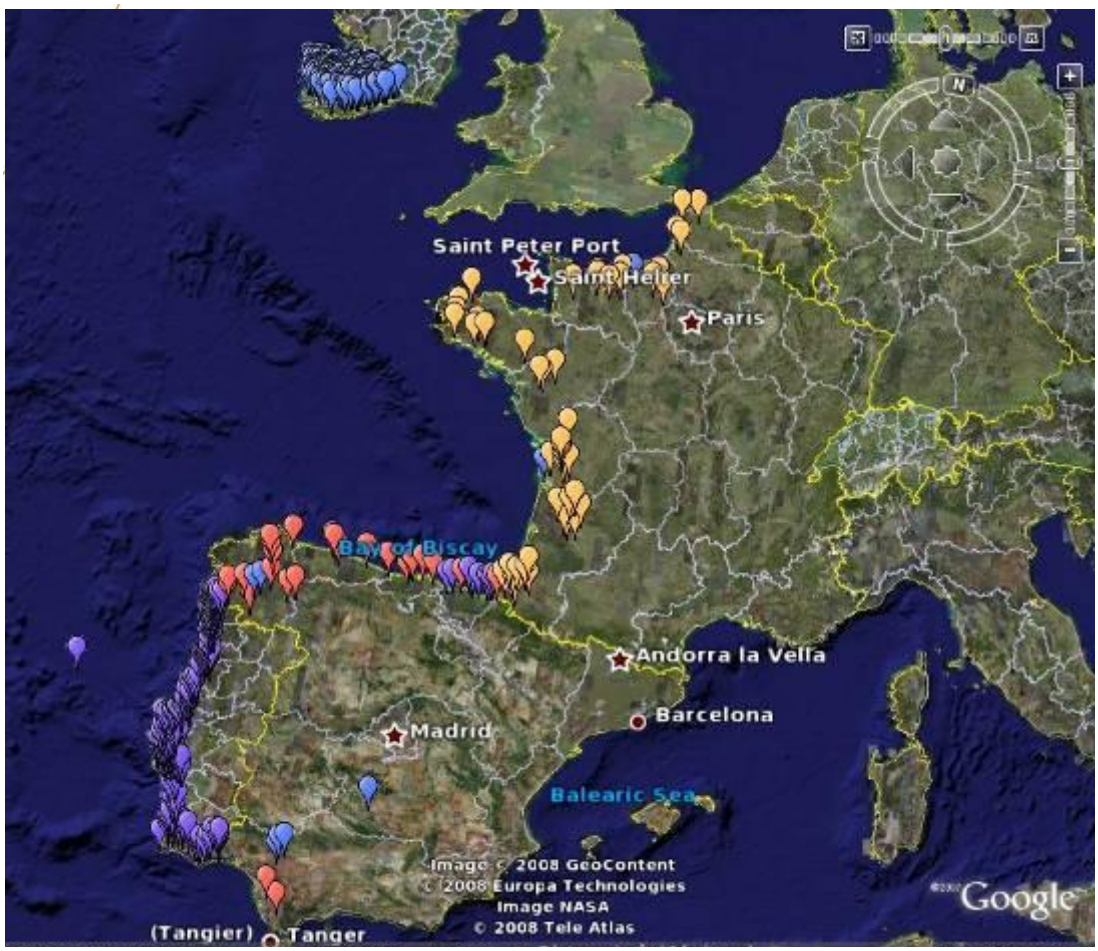

Figure 7.4: Distribution of River Runoff data provided by IBIROOS. The blue drops display the unchanged GRDC archive data. Purple updated historical data information; yellow= real time data info; red real time data info and historical data

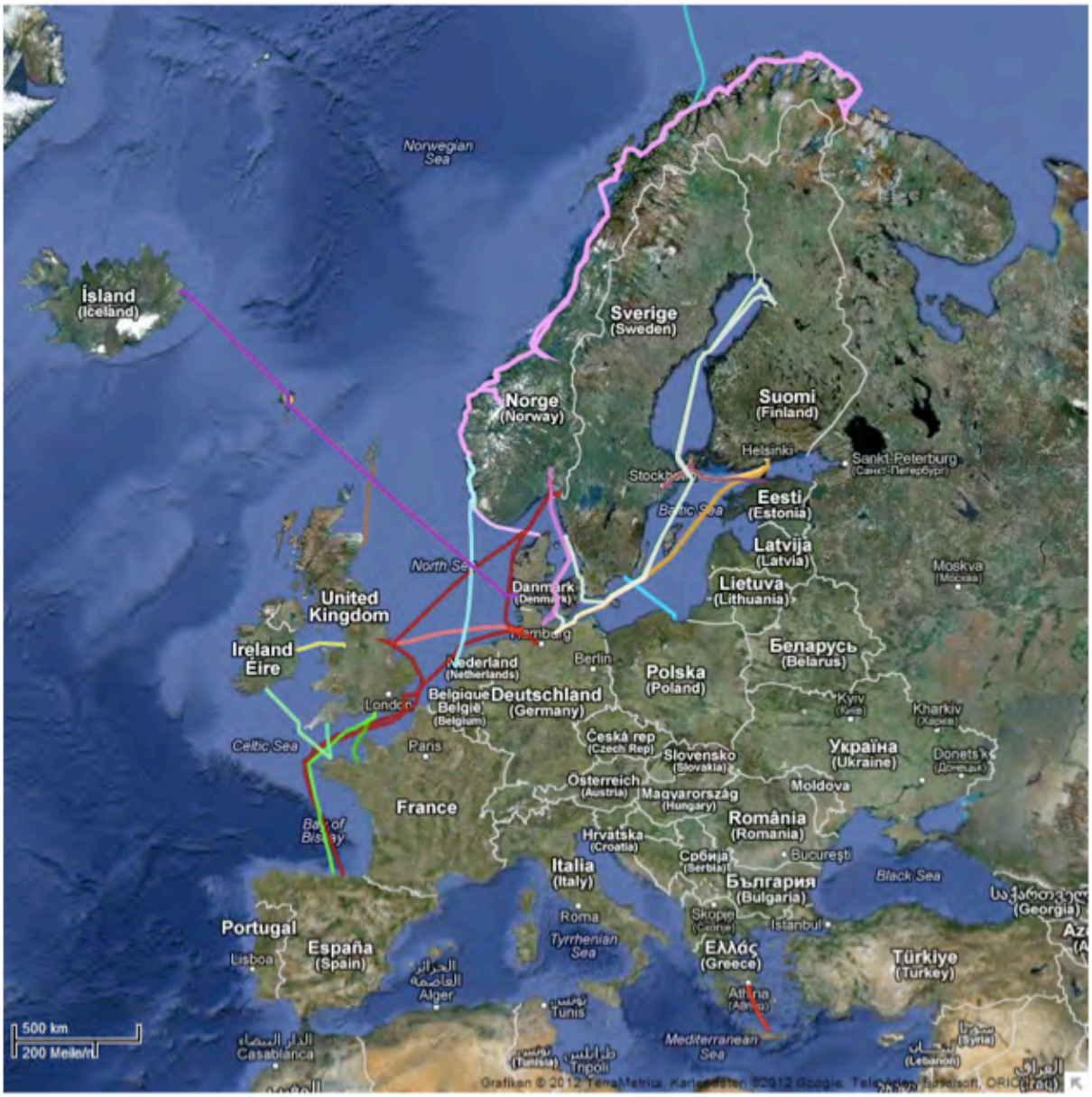

Figure 7.5: Distribution of Ferryboxes running within European waters. Within the IBIROOS region there are three Ferryboxes running, for two additional are historical data available. Figure taken from Jerico deliverable D 3.1 Report on the current status of Ferrybox ´

Table 7.1: Instantaneous status of variables available by the real time delivery system provided for the IBIROOS area (Status:30.12.2012)

Parameter/Variable	Number of real time data
Salinity	20
Temperature	38
Currents	15
Meteorological information	44
Waves	38
Sealevel	118

Table 7.2: Ferrybox lines running in the IBIROOS area.

Name of the Ship	**Route**	**Dataprovider**	**Variables covered**
Lysbris	Moss (N)-Cuxhaven(G)-Chatham(GB)- Bilbao (S)- Immingham	HZG	T, S, Diss Oxygen, Fluorescence, pH, Turbidity, nutrients
Pont Aven	Portsmouth(GB)-Santander(S)- Roscoff (F)- Cork (I)	IFREMER	T, S, Diss. Oxygen, Fluorescence, Turbidity, CDOM
NIOLON	Marseille Algier	IFREMER	T,S
Lagan Viking Stopped service	Birkenhead Belfast	NOCL	T, S, Fluorescence, Turbidity
Pride of Bilbao Stopped service	Portsmouth Bilbao	NOCS	T, S, Fluorescences, Oxigen, PCO2, Nutrients, irradiance, radiance

VIII IN SITU OBSERVING SYSTEMS IN THE MONGOOS REGION

The MONGOOS region covers the whole European Mediterranean Sea. 32 partners collaborate for the provision of operational Oceanography services. The observational system consists of multiplatform real time observing system that is composed by a Ship Of Opportunity Programme (SOOP), moored buoys, so-called Mediterranean Multi- sensor Moored Array (M3A), ARGO buoys Gliders and an EMSO multiparametric deep seafloor observation node. These system is complemented by the near coastal national monitoring arrays that are mainly providing wave, surface meteorological parameters, sea level monitoring completed by coastal mooring providing meteorological measurements and physical-chemical-biological data in coastal areas and HF-radars. In Figure 8.1 the status of real time data provided via the MyOcean data delivery is displayed for the month of September 2012. The list with available stations included in the EMODnet portal is compiled in the Annex

A total number of 714 platforms is reporting to the MONGOOS region Realtime data delivery system.

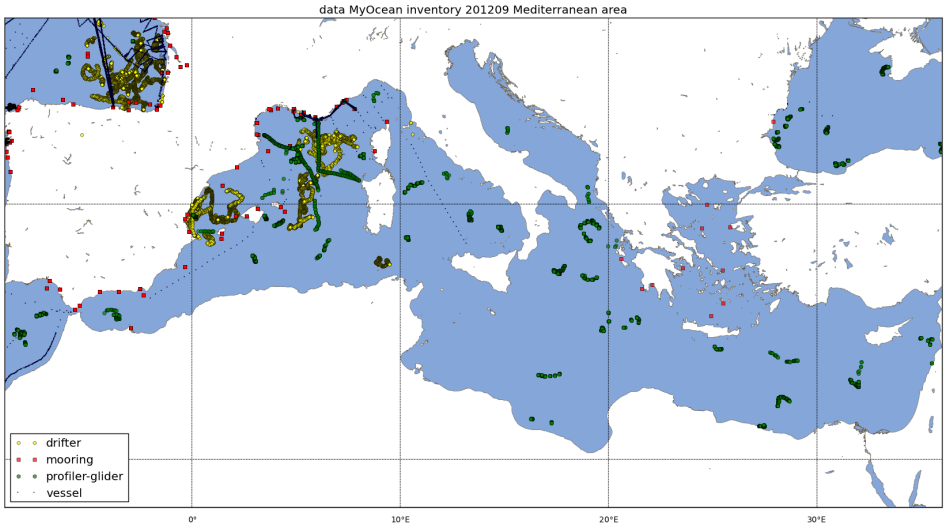

Figure 8.1: Realtime Data provided for the MONGOOS region via the EC supported MyOcean project.

The distribution of observational methodology used for the realtime delivery is displayed in Figure 8.2. Compared to the other regional systems the MONGOOS realtime data delivery system uses quite a wide range of observational methodology.

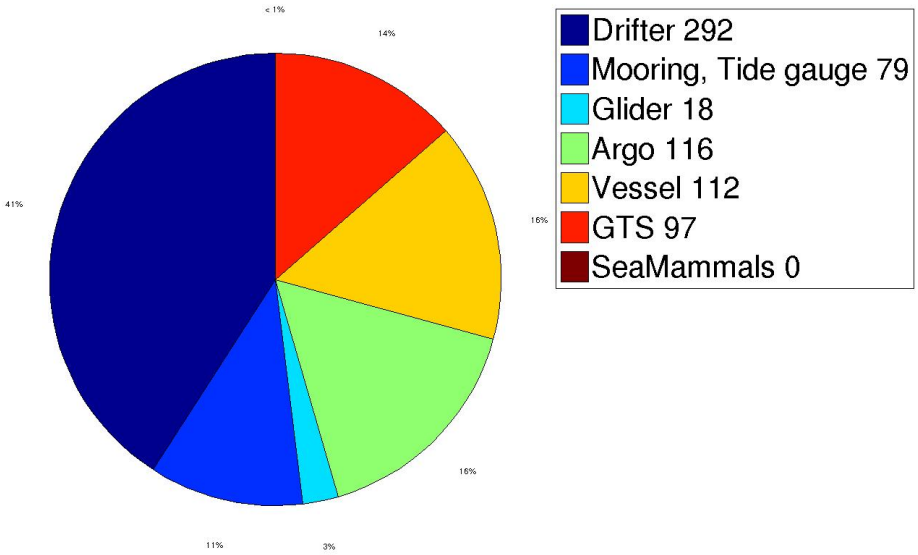

Figure 8.2: Distribution of platform types provided in the MyOcean realtime data delivery: The single platforms are identified by the different categories. In case of the GTS value, the platform provides not sufficient metadata to allocate the measurements to a specific platform.

The MONGOOS community has established seven moored deepwater sensor plattforms (positions see Figure 8.3) These seven plattforms measuring

Meteorological parameters

CTD (Conductivity, Temperature Depth)

Fluorescence

Oxygen (on 4 plattforms)

Nutrients

pH

CO2

And a seafloor cabled observatory NEMO SN 1 (position Figure 8.3) which is measuring

Currents

Tides

CTD

Turbidity

A SOOP program is established providing profiles of 700 m depth and meteorological information (see Figure 8.4 for distribution of the SOOP lines). The MONGOOS community operates a of a varying number of Gliders, operating within the whole Mediterranean Sea and a number of actually 116 Argo profiles per month. The observational activities are complimented by the application 292 surface drifters and four HF radar stations. Trajectories for the Mediterranean Surface Drifter program is displayed in Figure 8.5 and the position of the HF radars are displayed in Figure 8.6. Figure 8.7 displays the distribution of Ferrybox lines running within the European waters. The Jerico deliverable D 3.1 Report on the current status of Ferrybox ´describes the distribution and installment in detail. Therefor only the specifics are summarized within Table 8.1

Figure 8.3: Locations of the multi sensor moorings and of the cabled seafloor observatory NEMO-SN1 (red square) in the Mediterranean Sea.

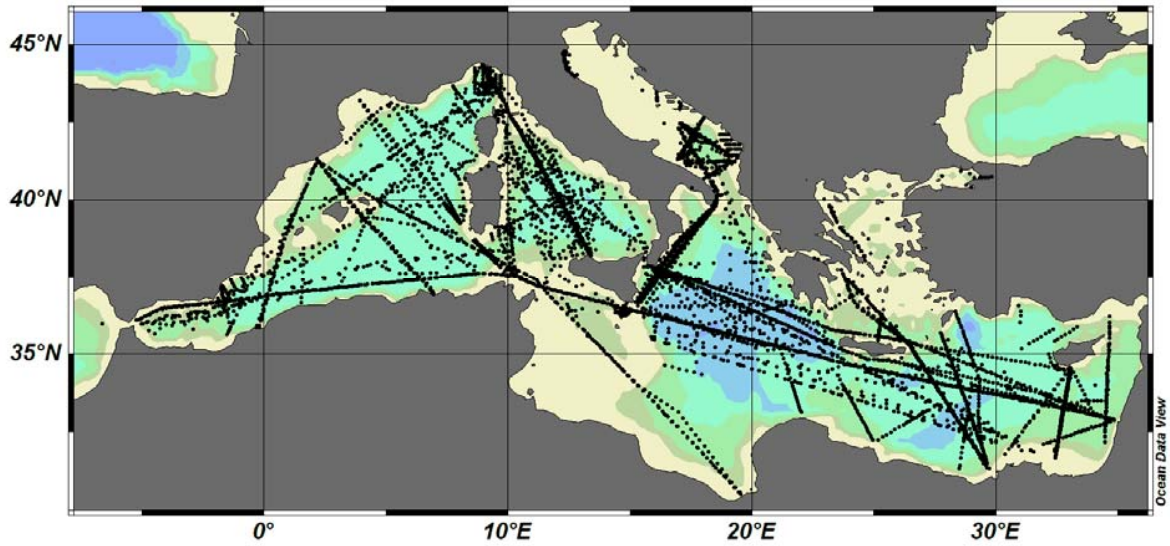

Figure 8.4: SOOP program providing 700 m profiles and meteo stations

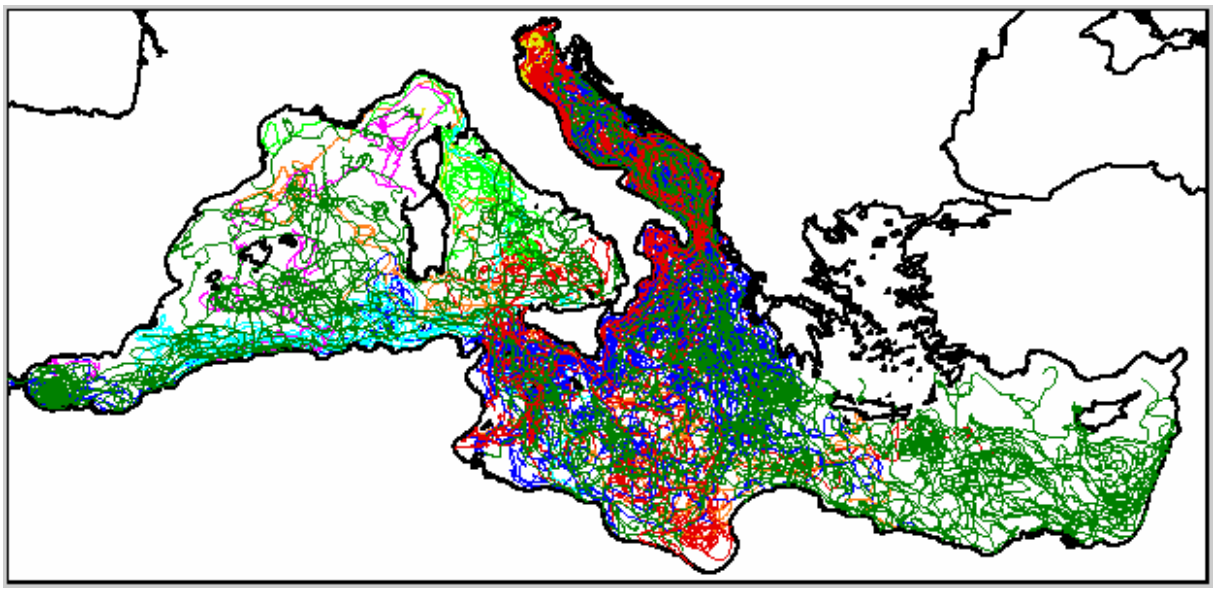

Figure 8.5: Mediterranean Surface Drifter Database. 2 June 1986 to 11 November 1999

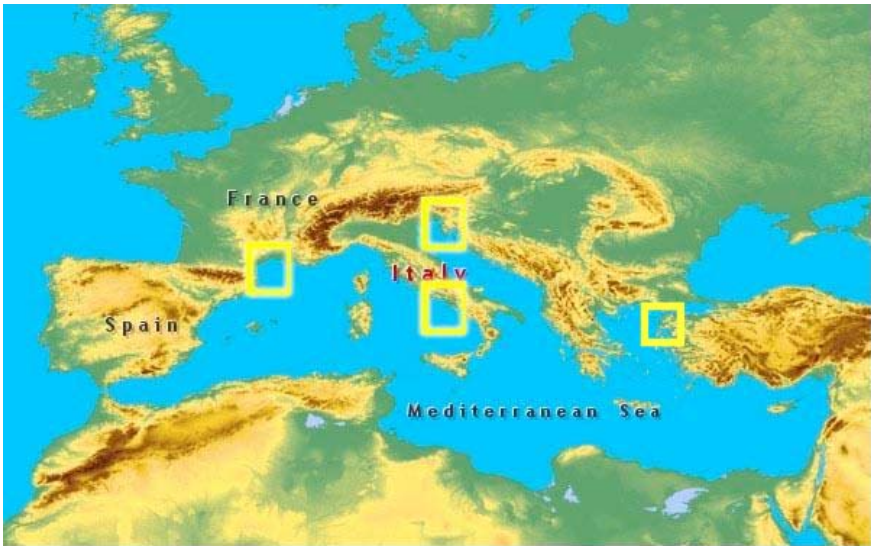

Figure 8.6: Position of the HF radar systems established in the Mediterranean region

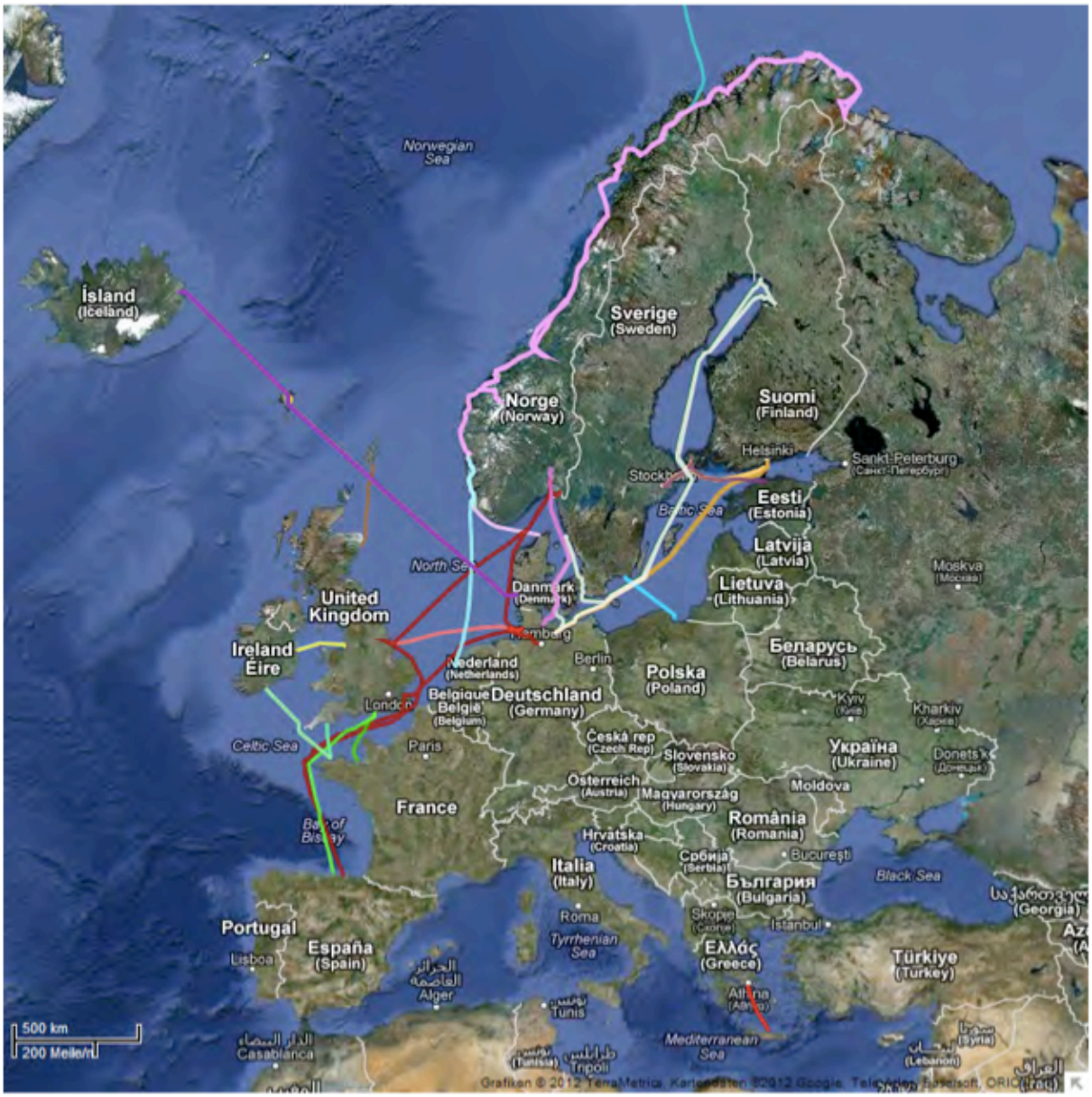

Figure 8.8: Distribution of Ferryboxes running within European waters. Within the IBIROOS region there is one Ferrybox running. Taken from Jerico deliverable D 3.1 Report on the current status of Ferrybox ´ .

Table 8.1: Ferrybox lines running in the MONGOOS area.

Name of the Ship	**Route**	**Dataprovider**	**Variables covered**
Olympic Champion	Piraeus (GR) – Heraklion(GR)	HCMR	T, S, Turbidity, Fluorescence, Diss Oxygen pH Oxygen, Fluorescence, pH, Turbidity, nutrients

IX IN SITU OBSERVING SYSTEMS IN THE BLACK SEA GOOS REGION

Within the Black Sea region the main focus for monitoring the status of the marine environment was laid on collecting data from mainly coastal stations and through scientific cruises. Most of these data are included in databases and are available on. The historical temperature and salinity data set covering the period 1990-2011 will be available in integrated form at the end of January 2013 via the efforts undertaken within the InSitu Thematic Assembly center from the EC supported project MyOcean II.
Within this project also the Real time data available within the Black Sea region are provided. Figure 9.1 displays the status of the realtime data provided via the MyOcean II system in September 2012 and reflects the scarcity of the real time measurements within that region. The list with available stations included in the EMODnet portal is compiled in the Annex
A total number of 6 platforms is reporting to the Black Sea GOOS region Realtime data delivery system.

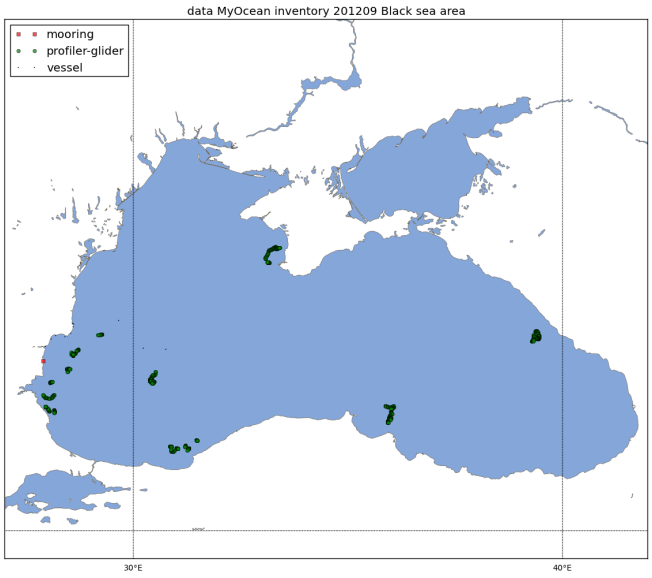

Figure 9.1: Realtime Data provided for the Black Sea GOOS region via the EC supported MyOcean project.

The distribution of observational methodology used for the realtime delivery is displayed in Figure 9.2. 4 Argo Buoys were delivering data complemented by 1 Tide Gauge and one vessel

providing data in real time. That reflects drastically the rapidly decreasing trend in the collection of In Situ measurements that is ongoing since 1990. The amount of collected in-situ data dramatically decreased which corresponds to reduced number of scientific vessels and cruises.

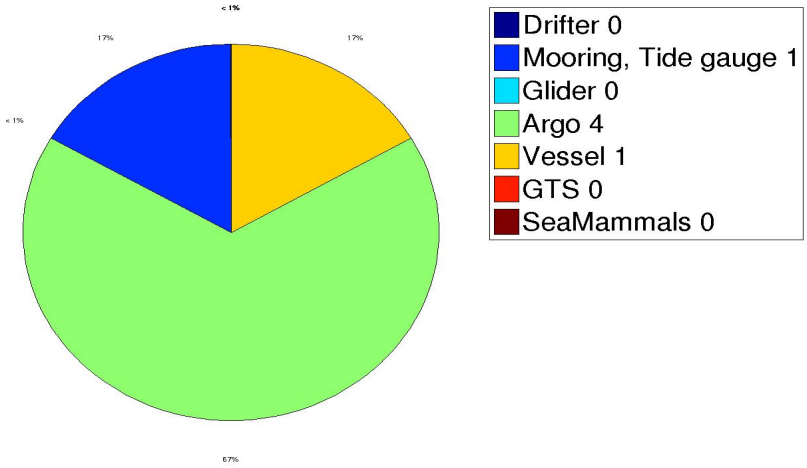

Figure 9.2: Distribution of platform types provided in the MyOcean realtime data delivery: The single platforms are identified by the different categories.

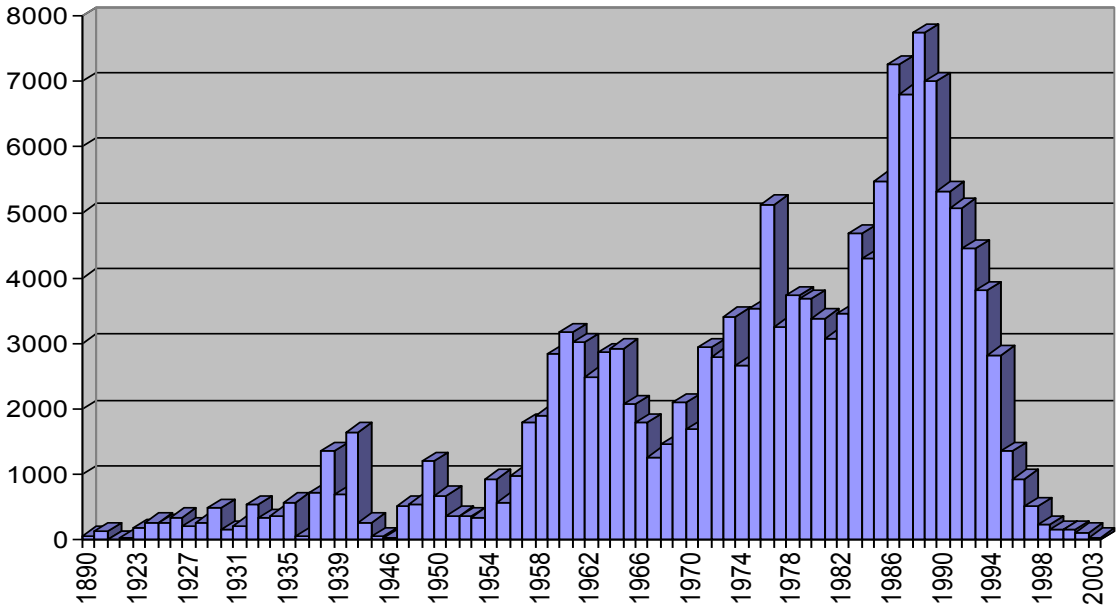

Figure 9.3: Number of CTD profiles from the Black Sea

The additionally existing observing systems do not provide real time data and some of them are not sustained for continuous operation. There is also no good geographic coverage especially for some regions and lack of data from open sea. An overview of available stations/observations is given in Table 9.1.

Table 9.1: Available additional observational efforts within the Black Sea region.

Observational Methodology	**Parameters/Variables**	**Amount of station realised**
Mooring	Currents	6
Plattform	Meteo, temp, sal, Sea level, waves, surface current	1
	Meteo	1
	Temperature	1
Tide Gauges	SSH	7
Coastal Networks	SST and Sea level	42
Seasonal surveys in coastal waters for physical and biogeochemical data	T, S, Chl a, Nutrients	Bulgaria, Romania,
Episodic surveys in coastal waters for physical and biogeochemical data	T, S, Chl a, Nutrients	Russia, Turkey, Ukraine
Regular observations in specific sites	T, S, Chl a, Nutrients	Turkey, Ukraine

X ANNEX: LIST OF STATIONS INCLUDED WITHIN EMODNET

Data provider	Station	Type	Longitude [degrees_east]	Latitude [degrees_north]
AMGI	Bakar_II	Buoy	14.54	45.305
BSH	Arkona_WR	Buoy	13.86667	54.88333
BSH	Barhoeft	Sea Level	13.03278	54.43972
BSH	DarsserS	Buoy	12.7	54.7
BSH	DarsserS	Buoy	12.7	54.7
BSH	DarsserS_WR	Buoy	12.7	54.7
BSH	Eckernfoerde	Sea Level	9.83611	54.47472
BSH	FehmarnBelt	Buoy	11.15	54.6
BSH	FehmarnBelt	Buoy	11.15	54.6
BSH	FINO1	Buoy	6.5833	54
BSH	Flensburg	Sea Level	9.43306	54.795
BSH	Greifswald	Sea Level	13.44611	54.09278
BSH	Heiligenhafen	Sea Level	11.00556	54.37306
BSH	Kalkgrund	Sea Level	9.88806	54.82472
BSH	Kiel_Holtenau	Sea Level	10.15694	54.37222
BSH	KielLT	Sea Level	10.27333	54.49972
BSH	Koserow	Sea Level	14.00083	54.06028
BSH	Langballigau	Sea Level	9.65417	54.82333
BSH	Luebeck	Sea Level	10.70306	53.89306
BSH	Neustadt	Sea Level	10.81278	54.09667
BSH	NsbII	Buoy	6.3333	55
BSH	Oderbank	Buoy	14.1667	54.0833

BSH	Rostock	Sea Level	12.155	54.08306
BSH	Sassnitz	Sea Level	13.64306	54.51083
BSH	Schleimuende	Sea Level	10.03667	54.67333
BSH	Stralsund	Sea Level	13.09861	54.31528
BSH	TimmendorfPoel	Sea Level	11.37556	53.99194
BSH	Travemuende	Sea Level	10.87222	53.95806
BSH	TWEms	Buoy	6.35	54.1667
BSH	Ueckermuende	Sea Level	14.06639	53.75028
BSH	UFSDeutscheBucht	Buoy	7.45	54.1667
BSH	Warnemuende	Sea Level	12.10333	54.16972
BSH	Wismar	Sea Level	11.45806	53.89889
BSH	Wolgast	Sea Level	13.77028	54.04167
CEFAS	Blackstones	Buoy	-7.57	56.06
CEFAS	Blakeney	Buoy	1.11	53.05
CEFAS	Dowsing	Buoy	1.05	53.53
CEFAS	Dungeness	Buoy	0.97	50.9
CEFAS	Firth of Forth	Buoy	-2.5	56.19
CEFAS	Hastings	Buoy	0.75	50.74
CEFAS	Hinkley point	Buoy	-3.16	51.23
CEFAS	Liverpool Bay	Buoy	-3.35	53.53
CEFAS	LiverpoolBay	Buoy	-3.3622	53.5328
CEFAS	Moray	Buoy	3.33	57.96
CEFAS	North Well	Buoy	0.47	53.06
CEFAS	OysterGround	Buoy	4.0421	54.4146
CEFAS	Poole Bay	Buoy	-1.72	50.63
CEFAS	Scarweather	Buoy	-3.93	51.43

CEFAS	South Knock	Buoy	1.58	51.57
CEFAS	Southwold	Buoy	1.78	52.31
CEFAS	Tyne	Buoy	-0.75	54.92
CEFAS	Warp-TH1-	Buoy	1.0255	51.5262
CEFAS	West Gabbard	Buoy	2.08	51.98
CEFAS	West of Hebrides	Buoy	-7.91	57.29
CEFAS	West Silver Pit	Buoy	0.62	53.54
CEFAS	WestGabbard	Buoy	2.0815	51.9801
CETMEF	61004	Buoy	6.207	42.93
CETMEF	61190	Buoy	3.7797	43.3715
CETMEF	61191	Buoy	3.1245	42.9162
CETMEF	61191	Buoy	3.1245	42.9162
CETMEF	62059	Buoy	-1.62	49.695
CETMEF	62064	Buoy	-1.4478	44.6503
CETMEF	62066	Buoy	-1.614	43.53
CETMEF	62067	Buoy	-2.295	46.833
CETMEF	62068	Buoy	-3.9607	48.7167
CETMEF	62069	Buoy	-4.9683	48.2903
CETMEF	62070	Buoy	-2.787	47.239
CNR	Acqua Alta	Platform	12.5014	45.3022
DAMSA	Bagenkop	Sea Level	10.63333	54.81667
DAMSA	Ballen	Sea Level	10.66667	55.75
DAMSA	Drogden	Buoy	12.71667	55.53333
DAMSA	Grena	Sea Level	10.93333	56.41667
DAMSA	Juelsminde	Sea Level	10.01667	55.71667
DAMSA	Nordre_Rose	Sea Level	12.7	55.63333

DAMSA	Rodvig	Sea Level	12.38333	55.25
DAMSA	SjaellandsOdde	Sea Level	11.38333	55.98333
DAMSA	Skagen	Sea Level	10.6	57.71667
DAMSA	W26	Buoy	10.95	55.4
DMI	Aarhus	Sea Level	10.21667	56.15
DMI	Fredericia	Sea Level	9.75	55.56667
DMI	Frederikshavn	Sea Level	10.56667	57.43333
DMI	Fynshav	Sea Level	9.98333	55
DMI	Gedser	Sea Level	11.93333	54.56667
DMI	Hornbaek	Sea Level	12.46667	56.1
DMI	Kobenhavn	Sea Level	12.6	55.7
DMI	Korsor	Sea Level	11.13333	55.33333
DMI	Rodby	Sea Level	11.35	54.65
DMI	Slipshavn	Sea Level	10.83333	55.28333
DMI	Tejn	Sea Level	14.83333	55.25
Dpt Fish& Mar. Res.	Paphos	Buoy	32.4	34.78333
EARS	Koper	Buoy	13.729	45.5489
Euskalmet	Donostia_buoy	Buoy	-2.02333	43.5633
Euskalmet	Matxitxako_buoy	Buoy	-2.69333	43.6317
FMI	Degerby	Sea Level	20.38333	60.03333
FMI	Helsinki	Sea Level	24.96667	60.15
FMI	Kaskinen	Sea Level	21.21667	62.33333
FMI	Kemi	Sea Level	24.51667	65.66667
FMI	Pietarsaari	Sea Level	22.7	63.7
France	IF000548	Buoy	-4.0029	47.7151

HCMR	ATHOS	Buoy	24.7242	39.9736
HCMR	Lesvo	Buoy	25.815	39.159
HCMR	Mykon	Buoy	25.462	37.523
HCMR	SANTO	Buoy	25.501	36.262
HCMR	SARON	Buoy	23.569	37.61
HCMR	SKYRO	Buoy	24.464	39.113
HCMR	ZAKYN	Buoy	20.604	37.956
Hydr. Inst. Croatia	Split	Buoy	16.44	43.507
Iceland	Blakknes	Buoy	-24.78	65.69
Iceland	Garoskagi	Buoy	-22.93	64.04
Iceland	Grimseyjarsund	Buoy	-18.19	66.29
Iceland	Grindavik	Buoy	-22.46	63.81
Iceland	Hornafjordur	Buoy	-15.18	64.19
Iceland	Kogur	Buoy	-13.62	65.64
Iceland	Straumnes	Buoy	-23.36	66.43
Iceland	Surtsey	Buoy	-20.34	63.28
IEO	6201030	Buoy	-3.77	43.84
IEO	Santander-AGL_buoy	Buoy	-3.77	43.84
Ifremer	61284	Buoy	4.8662	43.3189
Ifremer	62021	Buoy	-2.6567	47.46
Ifremer	62306	Buoy	-0.7425	45.1983
Ifremer	62307	Buoy	-0.2489	44.9142
Ifremer	62309	Buoy	-0.5461	44.8633
Ifremer	62443	Buoy	1.5696	50.7451
Ifremer	62450	Buoy	-4.55175	48.358
IMWM	Darlowo	Buoy	16.3803	54.4392

IMWM	Ustka	Buoy	16.85	54.58
IMWM	Wladyslawowo	Buoy	18.4186	54.7967
IMWN	Gdansk	Buoy	18.7	54.4
Inst. Hidrog. Portugal	Canical	Sea Level	-16.73	32.72
Inst. Hidrog. Portugal	Faro	Buoy	-16.94	32.62
Inst. Hidrog. Portugal	Funchal	Sea Level	-16.9417	32.6183
Inst. Hidrog. Portugal	Leix§es	Buoy	-8.93	37.92
Inst. Hidrog. Portugal	Sines	Buoy	-7.9	36.9
Instituto Hidrografico	Cascais		-9.41666	38.6833
Instituto Hidrografico	Lagos		-8.6667	37.1
Instituto Hidrografico	Monican01		-9.6342	39.5105
Instituto Hidrografico	Monican02		-9.1917	39.75
Instituto Hidrografico	Raia01		-9.562	41.1623
IOI	Malta MedGLOSS (Portomaso)	Buoy	14.503	35.917
ISPRA	Alghero	Buoy	8.1	40.535
ISPRA	Ancona	Buoy	13.71	43.83167
ISPRA	Ancona	SeaLevel	13.5058	43.6244
ISPRA	Bari	SeaLevel	16.8614	41.1369
ISPRA	Cagliari	Buoy	9.405	39.1133
ISPRA	Cagliari	SeaLevel	9.1142	39.2100

ISPRA	Carloforte	SeaLevel	8.3094	39.1478
ISPRA	Catania	Buoy	15.1467	37.44
ISPRA	Cetraro	Buoy	15.91833	39.4533
ISPRA	Civitavecchia	Buoy	11.7767	42
ISPRA	Civitavecchia	SeaLevel	11.7894	42.0936
ISPRA	Crotone	Buoy	17.2172	39.0178
ISPRA	Crotone	SeaLevel	17.1367	39.0814
ISPRA	Genova	SeaLevel	8.9253	44.4100
ISPRA	Imperia	SeaLevel	8.01861	43.8783
ISPRA	La Spezia	Buoy	9.8267	43.9283
ISPRA	Lampedusa	SeaLevel	12.6044	35.4997
ISPRA	Livorno	SeaLevel	10.2986	43.5464
ISPRA	Mazara del Vallo	Buoy	12.5333	37.5167
ISPRA	Messina	SeaLevel	15.5630	38.1961
ISPRA	Monopoli	Buoy	17.3767	40.975
ISPRA	Napoli	SeaLevel	14.2692	40.8408
ISPRA	Ortona	Buoy	14.5367	42.4067
ISPRA	Ortona	SeaLevel	14.4147	42.3558
ISPRA	Otranto	SeaLevel	18.4969	40.1472
ISPRA	Palermo	Buoy	13.3333	38.2583
ISPRA	Palermo	SeaLevel	13.3711	38.1214
ISPRA	Palinuro	SeaLevel	15.275	40.0314
ISPRA	Ponza	Buoy	12.95	40.8667
ISPRA	Porto Empedocle	SeaLevel	13.5269	37.2864
ISPRA	Porto Torres	SeaLevel	8.4036	40.8419
ISPRA	Ravenna	SeaLevel	12.2825	44.4919

ISPRA	Reggio Calabria	SeaLevel	15.6486	38.1211
ISPRA	Salerno	SeaLevel	14.7675	40.6719
ISPRA	Siniscola	Buoy	9.8917	40.6167
ISPRA	Taranto	SeaLevel	17.2247	40.4753
ISPRA	Trieste	SeaLevel	13.7586	45.6494
ISPRA	Venezia	Buoy	12.6333	44.9667
ISPRA	Venezia	SeaLevel	12.6494	45.4186
ISPRA	Vieste	SeaLevel	16.1786	41.8869
LEGMA	Daugavgriva	Buoy	24.01667	57.05
LEGMA	Kolka	Buoy	22.58333	57.73333
Mar. Hydro. Inst Ukraine	Kaciveli	Buoy	34.05	44.416
Marine Inst.	62091	Buoy	-5.42	53.47
Marine Inst.	62092	Buoy	-10.55	51.22
Marine Inst.	62094	Buoy	-6.7	51.69
Marine Inst.	62095	Buoy	-15.92	53.06
Marine Inst.	Aranmore	Buoy	-8.5	54.99
Marine Inst.	Castletownbere	Buoy	-9.9	51.65
Marine Inst.	Dublin_Port	Buoy	-6.22	53.35
Marine Inst.	DublinPort	Buoy	-6.22166	53.3457
Marine Inst.	Dundalk	Sea Level	-6.38	54
Marine Inst.	GalwayPort	Sea Level	-9.04	53.26
Marine Inst.	Howth	Sea Level	-6.06	53.39
Marine Inst.	Killybegs	Sea Level	-8.39	54.64
Marine Inst.	Killybegs	Sea Level	-8.39	54.63
Marine Inst.	Sligo	Sea Level	-8.57	54.3

Marine Inst.	Sligo	Sea Level	-8.58	54.3
Marine Inst.	Wexford	Buoy	-6.46	52.34
Marine Inst.	Wexford	Sea Level	-6.45	52.33
Marine Institute	Aranmore		-8.49562	54.9896
Marine Institute	Ballycotton		-8.0007	51.8278
Marine Institute	Ballyglass		-9.89	54.253
Marine Institute	Castletownbere		-9.9034	51.6496
Marine Institute	DublinPort		-6.22166	53.3457
Marine Institute	Dundalk		-6.385	54.008
Marine Institute	GalwayPort		-9.04796	53.269
Marine Institute	Howth		-6.0683	53.3915
Marine Institute	Inishmore		-9.66	53.126
Marine Institute	Killybegs		-8.3949	54.6364
Marine Institute	M2_E_of_Lambay		-5.42	53.47
Marine Institute	M3_SW_Mizen_Head		-10.55	51.22
Marine Institute	M4_Donegal_Bay		-9.07	54.67
Marine Institute	M5_South_East		-6.7	51.69
Marine Institute	M6		-15.92	53.06
Marine Institute	MalinHead		-7.33432	55.3717
Marine Institute	Sligo		-8.5689	54.3046
Marine Institute	Wexford		-6.4589	52.3385
MedGLOSS	Alexandria	Sea Level	29 917	31 217
MedGLOSS	Alexandropoulis	Sea Level	25 883	40 850
MedGLOSS	Alicante	Sea Level	-0.290	38 210
MedGLOSS	Antalya	Sea Level	30 617	36 833
MedGLOSS	Ashdod	Sea Level	34 635	31 811

MedGLOSS	Aspretto	Sea Level	8 817	41 933
MedGLOSS	Barcelona	Sea Level	2 177	41 385
MedGLOSS	Bodrum	Sea Level	27 429	37 036
MedGLOSS	Brindisi	Sea Level	17 933	40 633
MedGLOSS	Burgas	Sea Level	27 487	42 501
MedGLOSS	Cagliari	Sea Level	9 167	39 200
MedGLOSS	Ceuta	Sea Level	-5 317	35 900
MedGLOSS	Chios	Sea Level	26 140	38 376
MedGLOSS	Constantza	Sea Level	28 667	44 167
MedGLOSS	Dubrovnik	Sea Level	18 067	42 667
MedGLOSS	Erdek	Sea Level	27 850	40 383
MedGLOSS	Genova	Sea Level	8 900	44 400
MedGLOSS	Gibraltar	Sea Level	-5 350	36 117
MedGLOSS	Hadera	Sea Level	34 917	32 467
MedGLOSS	Istanbul	Sea Level	28 976	41 004
MedGLOSS	Kalamata	Sea Level	22 133	37 017
MedGLOSS	Malaga	Sea Level	4 433	36 900
MedGLOSS	Marseille	Sea Level	5 350	43 300
MedGLOSS	Mentes	Sea Level	26 732	38 414
MedGLOSS	Nador	Sea Level	-2 950	35 167
MedGLOSS	Napoli	Sea Level	14 250	40 833
MedGLOSS	Otranto	Sea Level	18 500	40 133
MedGLOSS	Palma	Sea Level	2 633	39 583
MedGLOSS	Paphos	Sea Level	32 401	34 783
MedGLOSS	Piraieus	Sea Level	23 639	37 940
MedGLOSS	Porto Empedocle	Sea Level	13 533	37 283

MedGLOSS	Porto Maso	Sea Level	14 519	35 909
MedGLOSS	Preveza	Sea Level	20 767	38 950
MedGLOSS	Ravenna	Sea Level	12 283	44 500
MedGLOSS	Rhodos	Sea Level	28 233	36 433
MedGLOSS	Skopelos	Sea Level	23 723	39 132
MedGLOSS	Souda	Sea Level	24 050	35 500
MedGLOSS	Split	Sea Level	16 442	43 507
MedGLOSS	Thessaloniki	Sea Level	23 033	40 617
MedGLOSS	Trieste	Sea Level	13 750	45 650
MedGLOSS	Tuapse	Sea Level	39 067	44 100
MedGLOSS/MHI	Katcively	Sea Level	34 050	44 416
Meteo France	61001	Sea Level	7.8	43.4
Meteo France	61002	Sea Level	4.7	42.1
Meteo France	61188	Sea Level	3.1683	42.4883
Meteo France	61431	Sea Level	4.1333	43.425
Meteo France	62052	Buoy	-5.8	48.5
Meteo France	62052	Sea Level	-5.8	48.5
Meteo France	62061	Sea Level	-2.343	48.9884
Meteo France	62072	Sea Level	1.37	50.6592
Meteo France	6100292	Sea Level	5.23	43.2083
Meteo France	IF000549	Sea Level	-2.9577	47.3938
Meteo France	IF000550	Sea Level	-1.1567	49.492
Meteo France	IF000562	Sea Level	0.12346	49.6688
MetNo	Helgeroa	Buoy	9.87	59
MetNo	Oscarsborg	Buoy	10.62	59.68
MetNo	Stavanger	Buoy	5.73	58.97

MetNo	Tregde	Buoy	7.57	58
MHI	Katsiveli	Platform	34.05	44.4167
MIG	Hel	Buoy	18.8	54.61
MSI	Heltermaa	Buoy	23.04667	58.86639
MSI	Kuivastu	Buoy	23.39361	58.57417
MSI	Lehtma	Buoy	22.69694	59.06889
MSI	Paldiski	Buoy	24.07972	59.335
MSI	Rohukula	Buoy	23.42472	58.905
MSI	Sillamae	Sea Level	27.74	59.42278
MSI	Soru	Sea Level	22.52278	58.69389
MSI	Tallinn	Sea Level	24.76361	59.44444
MSI	Triigi	Buoy	22.71722	58.59139
MSI	Virtsu	Buoy	23.50806	58.57611
MUMM	Westhinder	Buoy	2.44	51.39
NOC	Cromer	TS	1.3035	52.9339
NOC	Devonport	TS	-4.1841	50.3678
NOC	Felixstowe	TS	1.3483	51.9572
NOC	Fishguard	TS	-4.9828	52.0127
NOC	Heysham	TS	-2.9124	54.0337
NOC	Holyhead	TS	-4.6306	53.3089
NOC	Jersey	TS	-2.1167	49.1833
NOC	Kinlochbervie	TS	-5.0496	58.4572
NOC	Leith	TS	-3.1804	55.9898
NOC	Lerwick	TS	-1.1384	60.1546
NOC	Lowestoft	TS	1.7518	52.4725
NOC	Millport	TS	-4.9047	55.7497

NOC	Moray Firth	TS	-4.0006	57.5995
NOC	North Shields	TS	-1.4383	55.0073
NOC	Port Ellen	TS	-6.1893	55.6278
NOC	Port Erin	TS	-4.7669	54.0853
NOC	Sheerness	TS	0.745	51.4451
NOC	St Mary's	TS	-6.3156	49.9179
NOC	Stornoway	TS	6.3879	58.2081
NOC	Whitby	TS	-0.6126	54.4899
Norwegian Hydrographic Serv.	Alesund	Buoy	6.15	62.4667
Norwegian Hydrographic Serv.	Andenes	Buoy	16.15	69.3167
Norwegian Hydrographic Serv.	Bergen	Buoy	5.3	60.4
Norwegian Hydrographic Serv.	Bodo	Buoy	14.3833	67.2833
Norwegian Hydrographic Serv.	Hammerfest	Buoy	23.6833	70.6667
Norwegian Hydrographic Serv.	Harstad	Buoy	16.55	68.8
Norwegian Hydrographic Serv.	Hejmsjo	Buoy	9.1167	63.4333
Norwegian Hydrographic Serv.	HonningsvÕg	Buoy	25.9833	70.9833
Norwegian Hydrographic Serv.	KabelvÕg	Buoy	14.5	68.2167

Norwegian Hydrographic Serv.	Kristiansund	Buoy	7.75	63.1167
Norwegian Hydrographic Serv.	Maloy	Buoy	5.1167	61.9333
Norwegian Hydrographic Serv.	Narvik	Buoy	17.4167	68.4333
Norwegian Hydrographic Serv.	Ny-Olesund	Buoy	11.95	78.9333
Norwegian Hydrographic Serv.	Oslo	Buoy	10.7333	59.9
Norwegian Hydrographic Serv.	Rorvik	Buoy	11.25	64.8667
Norwegian Hydrographic Serv.	Tromso	Buoy	18.9667	69.65
Norwegian Hydrographic Serv.	Trondheim	Buoy	10.4	63.4333
Norwegian Hydrographic Serv.	Vardo	Buoy	31.1	70.3333
Norwegian Hydrographic Serv.	Viker	Buoy	10.95	59.0333
Ntl Inst Mar. Res.	Constantza	Buoy	28.67	44.16667
NWAHEM	Kronstadt	Buoy	29.75	59.96667
NWAHEM	StPetersburg	Sea Level	30.26667	59.93333
Oil Platform	62114	Platform	-3.5	53.8
Oil Platform	62114	Platform	-3.5	53.8
Oil Platform	62125	Platform	2.1	53

Oil Platform	62125	Platform	2.1	53
Oil Platform	62142	Platform	1.7	53.4
Oil Platform	62142	Platform	1.7	53.4
Oil Platform	62144	Platform	2.8	53.1
Oil Platform	62144	Platform	2.8	53.1
Oil Platform	62145	Platform	1.7	57.6
Oil Platform	62145	Platform	1.7	57.6
Oil Platform	62147	Platform	0.5	57.2
Oil Platform	62147	Platform	0.5	57.2
Oil Platform	62164	Platform	0.5	57.2
Oil Platform	62164	Platform	0.5	57.2
Oil Platform	62166	Platform	1.5	59.5
Oil Platform	63110	Platform	1	61.1
Oil Platform	63110	Platform	1	61.1
Oil Platform	63112	Platform	1.7	61
Oil Platform	63112	Platform	1.7	61
Oil Platform	68422	Platform	21.608	36.829
Oil Platform	North Comorant	Sea Level	1.17	61.23
POL/METOFFICE	Aberdeen		-2.08333	57.15
POL/METOFFICE	Avonmouth		-2.7114	51.5071
POL/METOFFICE	Bangor		-5.6692	54.665
POL/METOFFICE	Barmouth		-4.03333	52.7167
POL/METOFFICE	Bournemouth		-1.8	50.7667

POL/METOFFICE	Cromer		1.3	52.9333
POL/METOFFICE	Dover		1.31667	51.1167
POL/METOFFICE	Felixstowe		1.35	51.9667
POL/METOFFICE	Fishguard		-4.98333	52.0167
POL/METOFFICE	Harwich		1.292	51.948
POL/METOFFICE	Heysham		-2.91667	54.0333
POL/METOFFICE	Hinkley		-3.13333	51.2167
POL/METOFFICE	Holyhead		-4.61667	53.3167
POL/METOFFICE	Ilfracombe		-4.11667	51.2167
POL/METOFFICE	Immingham		-0.18333	53.6333
POL/METOFFICE	Kinlochbervie		-5.0496	58.4572
POL/METOFFICE	Leith		-3.1804	55.9898
POL/METOFFICE	Lerwick		-1.1384	60.1546
POL/METOFFICE	Liverpool		-3.01667	53.45
POL/METOFFICE	Llandudno		-3.8237	53.3148
POL/METOFFICE	Lowestoft		1.75	52.4667
POL/METOFFICE	Milford		-5.05	51.7167

POL/METOFFICE	Millport		-4.9047	55.7497
POL/METOFFICE	Mumbles		-3.9737	51.5697
POL/METOFFICE	Newhaven		0.06667	50.7833
POL/METOFFICE	Newlyn		-5.53333	50.1
POL/METOFFICE	Newport		-2.986	51.5496
POL/METOFFICE	NorthShields		1.43333	55
POL/METOFFICE	Plymouth		-4.08333	50.2333
POL/METOFFICE	PortEllen		-6.1893	55.6278
POL/METOFFICE	PortErin		-4.7669	54.0853
POL/METOFFICE	Portpatrick		-5.1189	54.8424
POL/METOFFICE	Portrush		-6.6667	55.2
POL/METOFFICE	Portsmouth		-1.1102	50.8004
POL/METOFFICE	Sheerness		0.75	51.45
POL/METOFFICE	StHelier		-2.1167	49.1833
POL/METOFFICE	StMarys		-6.3156	49.9179
POL/METOFFICE	Stornoway		-6.38333	58.2167
POL/METOFFICE	Tobermory		-6.0631	56.6231

POL/METOFFICE	Ullapool		-5.1568	57.8955
POL/METOFFICE	Weymouth		-2.4465	50.6079
POL/METOFFICE	Whitby		-0.61667	54.4833
POL/METOFFICE	Wick		-3.08333	58.4333
POL/METOFFICE	Workington		-3.56667	54.65
Puertos del Estado	AlcudiaTG	Sea Level	3.13917	39.8347
Puertos del Estado	Algeciras_cost	Buoy	-5.416	36.066
Puertos del Estado	AlgecirasTG	Sea Level	-5.39833	36.1769
Puertos del Estado	Alicante_cost	Buoy	-0.41	38.25
Puertos del Estado	AlmeriaTG	Sea Level	-2.478	36.83
Puertos del Estado	ArrecifeTG	Sea Level	-13.53	28.967
Puertos del Estado	Barcelona_cost	Buoy	2.2	41.32
Puertos del Estado	BarcelonaTG	Sea Level	2.163	41.342
Puertos del Estado	Bilbao_buoy	Buoy	-3.04	43.64
Puertos del Estado	Bilbao_cost	Buoy	-3.13	43.397
Puertos del Estado	BilbaoTG	Sea Level	-3.05	43.357
Puertos del Estado	BonanzaTG	Sea Level	-6.34	36.8
Puertos del Estado	Cabo_Begur_buoy	Buoy	3.64	41.92
Puertos del Estado	Cabo_de_Gata_buoy	Buoy	-2.32	36.57
Puertos del Estado	Cabo_de_Gata_cost	Buoy	-2.203	36.713
Puertos del Estado	Cabo_de_Palos_buoy	Buoy	-0.33	37.65
Puertos del Estado	Cabo_de_Palos_cost	Buoy	-0.638	37.654
Puertos del Estado	Cabo_de_Penas_buoy	Buoy	-6.19	43.73

Puertos del Estado	Cadiz_buoy	Buoy	-6.98	36.84
Puertos del Estado	Cadiz_cost	Buoy	-6.33	36.5
Puertos del Estado	Capdepera_cost	Buoy	3.485	39.651
Puertos del Estado	Ceuta_cost	Buoy	-5.33	35.903
Puertos del Estado	CorunaTG	Sea Level	-8.389	43.357
Puertos del Estado	Dragonera_buoy	Buoy	2.1	39.56
Puertos del Estado	ElHierroTG	Sea Level	-17.9	27.78
Puertos del Estado	Estaca_de_Bares_buoy	Buoy	-7.62	44.06
Puertos del Estado	FerrolTG	Sea Level	-8.326	43.463
Puertos del Estado	FormenteraTG	Sea Level	1.41889	38.7347
Puertos del Estado	FuerteventuraTG	Sea Level	-13.85	28.5
Puertos del Estado	GandiaTG	Sea Level	-0.152	38.995
Puertos del Estado	Gijon_cost	Buoy	-5.667	43.612
Puertos del Estado	GijonTG	Sea Level	-5.698	43.558
Puertos del Estado	GomeraTG	Sea Level	-17	28
Puertos del Estado	Gran_Canaria_buoy	Buoy	-15.81	28.19
Puertos del Estado	Granadilla_cost	Buoy	-16.47	28.09
Puertos del Estado	HuelvaTG	Sea Level	-6.834	37.132
Puertos del Estado	IbizaTG	Sea Level	1.44972	38.9111
Puertos del Estado	LaCoruna_cost	Buoy	-8.383	43.413
Puertos del Estado	Langosteira_cost	Buoy	-8.533	43.355
Puertos del Estado	LaPalmaTG	Sea Level	-17.768	28.678
Puertos del Estado	LasPalmasConfital_cost	Buoy	-15.455	28.138
Puertos del Estado	LasPalmasEste_cost	Buoy	-15.39	28.05
Puertos del Estado	LasPalmasTG	Sea Level	-15.412	28.141

Puertos del Estado	Mahon_buoy	Buoy	4.44	39.72
Puertos del Estado	MahonTG	Sea Level	4.27056	39.893
Puertos del Estado	Malaga_cost	Buoy	-4.415	36.692
Puertos del Estado	MalagaTG	Sea Level	-4.417	36.712
Puertos del Estado	Melilla_cost	Buoy	-2.944	35.327
Puertos del Estado	MelillaTG	Sea Level	-2.918	35.291
Puertos del Estado	MotrilTG	Sea Level	-3.524	36.72
Puertos del Estado	Palamos_cost	Buoy	3.187	41.83
Puertos del Estado	PalmadeMallorcaTG	Sea Level	2.6375	39.5603
Puertos del Estado	Pasajes_cost	Buoy	-1.89	43.37
Puertos del Estado	SaguntoTG	Sea Level	-0.206	39.634
Puertos del Estado	SantaCruzTenerife_cost	Buoy	-16.23	28.46
Puertos del Estado	SantanderTG	Sea Level	-3.791	43.461
Puertos del Estado	Sevilla_cost	Buoy	-6.475	36.738
Puertos del Estado	Silleiro_buoy	Buoy	-9.4	42.12
Puertos del Estado	Tarifa_cost	Buoy	-5.59	36
Puertos del Estado	TarifaTG	Sea Level	-5.60361	36.0064
Puertos del Estado	Tarragona_buoy	Buoy	1.47	40.68
Puertos del Estado	Tarragona_cost	Buoy	1.19	41.07
Puertos del Estado	Tenerife_buoy	Buoy	-16.58	28
Puertos del Estado	TenerifeTG	Sea Level	-16.24	28.48
Puertos del Estado	Valencia_buoy	Buoy	0.2	39.52
Puertos del Estado	Valencia_cost	Buoy	-0.2	39.51
Puertos del Estado	ValenciaTG	Sea Level	-0.33	39.46
Puertos del Estado	VigoTG	Sea Level	-8.726	42.243

Puertos del Estado	VillagarciaTG	Sea Level	-8.77	42.601
Puertos del Estado	Villano-Sisargas_buoy	Buoy	-9.21	43.49
RIJKZ	Amelander11	Buoy	5.481	53.5
RIJKZ	Amelander12	Buoy	5.484	53.5
RIJKZ	Amelander21	Buoy	5.574	53.47
RIJKZ	Amelander31	Buoy	5.604	53.45
RIJKZ	DenHelder	Buoy	4.75	52.97
RIJKZ	Europlatform	Buoy	3.27	51.99
RIJKZ	Ijmuiden	Buoy	4.55	52.46
RIJKZ	K13a	Buoy	3.22	53.22
RIJKZ	KornwerderzandBuiten	Buoy	5.34	53.07
RIJKZ	LesPierresNoires	Buoy	-4.915	48.31
RIJKZ	LichteilandGoeree	Buoy	3.669	51.925
RIJKZ	Ouessantlarge	Buoy	-5.75	48.5
RIJKZ	WaddenEierlandseGat	Buoy	4.66	53.28
RIJKZ	WaddenSchiermonnikoog	Buoy	6.17	53.59
SHOM	AjaccioTG	Sea Level	8.763	41.923
SHOM	ArcachonEyracTG	Sea Level	-1.164	44.665
SHOM	BayonneBoucauTG	Sea Level	-1.516	43.527
SHOM	BoulogneSurMerTG	Sea Level	1.577	50.728
SHOM	BrestTG	Sea Level	-4.495	48.383
SHOM	CalaisTG	Sea Level	1.868	50.969
SHOM	CenturiTG	Sea Level	9.35	42.966
SHOM	Cherbourg	Buoy	-1.6355	49.6522
SHOM	Cherbourg	Buoy	-1.62	49.69

SHOM	CherbourgTG	Sea Level	-1.636	49.651
SHOM	ConcarneauTG	Sea Level	-3.907	47.874
SHOM	DieppeTG	Sea Level	1.085	49.929
SHOM	DunkerqueTG	Sea Level	2.367	51.048
SHOM	EXSH0001	Buoy	-4.78	48.36
SHOM	EXSH0002	Buoy	-4.5	48.38
SHOM	EXSH0003	Buoy	-2.2	47.26
SHOM	EXSH0004	Buoy	-1.63	49.65
SHOM	EXSH0006	Buoy	0.1063	49.4819
SHOM	EXSH0007	Buoy	7.2853	43.6955
SHOM	EXSH0009	Buoy	1.085	49.93
SHOM	EXSH0010	Buoy	8.76	41.92
SHOM	EXSH0011	Buoy	5.3558	43.2911
SHOM	EXSH0012	Buoy	-3.966	48.716
SHOM	EXSH0013	Buoy	1.86772	50.9694
SHOM	EXSH0014	Buoy	-2.028	48.6416
SHOM	EXSH0015	Buoy	1.57746	50.7275
SHOM	EXSH0016	Buoy	-1.16355	44.665
SHOM	EXSH0017	Buoy	-3.90738	47.8737
SHOM	EXSH0018	Buoy	-2.89515	47.5427
SHOM	EXSH0020	Buoy	-1.79373	46.4975
SHOM	EXSH0021	Buoy	-1.22065	46.1585
SHOM	EXSH0022	Buoy	4.89293	43.4049
SHOM	EXSH0024	Buoy	-1.06157	45.5685
SHOM	EXSH0025	Buoy	9.404	41.857
SHOM	EXSH0026	Buoy	9.35015	42.9669

SHOM	EXSH0027	Buoy	7.42373	43.7329
SHOM	EXSH0028	Buoy	3.10733	42.5201
SHOM	EXSH0030	Buoy	-1.51483	43.5273
SHOM	EXSH0031	Buoy	-1.68162	43.3952
SHOM	EXSH0032	Buoy	6.93377	43.4835
SHOM	EXSH0033	Buoy	3.69911	43.3976
SHOM	FosSurMerTG	Sea Level	4.893	43.405
SHOM	IleDAixTG	Sea Level	-1.174	46.007
SHOM	IleRousseTG	Sea Level	6.935	43.484
SHOM	LaFigueiretteTG	Sea Level	8.935	42.64
SHOM	LaRochelleTG	Sea Level	-1.221	46.159
SHOM	Le_Conquet	Buoy	-4.78	48.36
SHOM	Le_Havre	Buoy	0.11	49.44
SHOM	LeConquetTG	Sea Level	-4.781	48.359
SHOM	LeCrouestyTG	Sea Level	-2.895	47.543
SHOM	LeHavreTG	Sea Level	0.106	49.482
SHOM	LesSablesDOlonneTG	Sea Level	-1.794	46.497
SHOM	MarseilleTG	Sea Level	5.354	43.279
SHOM	MonacoTG	Sea Level	7.421	43.729
SHOM	NiceTG	Sea Level	7.285	43.696
SHOM	PortBlocTG	Sea Level	-1.062	45.568
SHOM	PortTudyTG	Sea Level	-3.446	47.644
SHOM	PortVendresTG	Sea Level	3.107	42.52
SHOM	RoscoffTG	Sea Level	-3.966	48.718
SHOM	SaintMaloTG	Sea Level	-2.028	48.641
SHOM	SaintNazaireTG	Sea Level	-2.202	47.267

SHOM	SeteTG	Sea Level	3.699	43.398
SHOM	SocoaTG	Sea Level	-1.682	43.395
SHOM	SolenzaraTG	Sea Level	9.404	41.857
SHOM	ToulonTG	Sea Level	5.914	43.123
SMHI	Barseback	Buoy	12.90333	55.75639
SMHI	Forsmark	Buoy	18.21083	60.40861
SMHI	Furuogrund	Buoy	21.23056	64.91583
SMHI	GoteborgTorshamnen	Buoy	11.79056	57.68472
SMHI	HuvudskarOst	Buoy	19.16667	58.93333
SMHI	Klagshamn	Buoy	12.89361	55.52222
SMHI	Kungsholmsfort	Buoy	15.58944	56.10528
SMHI	Kungsvik	Buoy	11.12722	58.99667
SMHI	LandsortNorra	Buoy	17.85889	58.76889
SMHI	Marviken	Buoy	16.83722	58.55361
SMHI	Oskarshamn	Buoy	16.47806	57.275
SMHI	Ratan	Buoy	20.895	63.98611
SMHI	Ringhals	Buoy	12.1125	57.24972
SMHI	Simrishamn	Buoy	14.35778	55.5575
SMHI	Skanor	Buoy	12.82944	55.41667
SMHI	Smogen	Buoy	11.21778	58.35361
SMHI	Spikarna	Buoy	17.53111	62.36333
SMHI	Stockholm	Buoy	18.08167	59.32417
SMHI	Vaderoarna	Buoy	10.93333	58.48333
SMHI	Viken	Buoy	12.57917	56.14222
SMHI	Finngrundet	Buoy	18.66667	61

Hydrometeocenter of Russia	Anapa	Sea Level	37 300	44 900
Hydrometeocenter of Russia	Novorossiysk	Sea Level	37 800	44 700
Hydrometeocenter of Russia	Gelendzhik	Sea Level	38 000	44 600
Hydrometeocenter of Russia	Dzhugba	Sea Level	38 700	44 300
Hydrometeocenter of Russia	Tuapse	Sea Level	39 100	44 100
Hydrometeocenter of Russia	Sochi	Sea Level	39 800	43 500
Hydrometeocenter of Russia	Adler	Sea Level	39 800	43 400
TUDES	Amasra	Sea Level	32.3853	41.7494
TUDES	Antalya	Sea Level	30.6167	36.8333
TUDES	Bodrum	Sea Level	27.595	37.24
TUDES	Erdek	Sea Level	27.85	40.3833
TUDES	Erdemly	Sea Level	34.25	36.5667
TUDES	Ereglisi	Sea Level	27.9667	40.9667
TUDES	Igneada	Sea Level	32.0167	41.8333
TUDES	Iskenderun	Sea Level	36.1667	36.5833
TUDES	Izmir	Sea Level	26.50	38.4167
TUDES	Mentes	Sea Level	26.7167	38.4333
TUDES	Sinop	Sea Level	35.1575	42.0269
TUDES	Trabzon	Sea Level	39.7269	41.005
UCY OC	MedGOOS 3	Buoy	32.1336	33.6985
UKMO/MeteoFrance	62052_buoy	Buoy	-5.83	48.5
UKMO/MeteoFra	Aberporth_buoy	Buoy	-4.7	52.4

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UKMO/MeteoFrance	Brittany_buoy	Buoy	-8.5	47.5
UKMO/MeteoFrance	Channel_Lightship	Buoy	-2.9	49.9
UKMO/MeteoFrance	Gascogne_buoy	Buoy	-5	45.3
UKMO/MeteoFrance	Greenwich_Lightship	Buoy	0	50.4
UKMO/MeteoFrance	K1_buoy	Buoy	-12.5	48.7
UKMO/MeteoFrance	K2_buoy	Buoy	-13.3	50
UKMO/MeteoFrance	K4_buoy	Buoy	-12.6	55.4
UKMO/MeteoFrance	K5_buoy	Buoy	-11.7	59.1
UKMO/MeteoFrance	K7_buoy	Buoy	-4.9	60.6
UKMO/MeteoFrance	Sandettie_Lightship	Buoy	1.8	51.1
UKMO/MeteoFrance	Seven_Stones_Lightship	Buoy	-6.1	50.1
UKMO/MeteoFrance	Turbot_Bank_buoy	Buoy	-5.1	51.6
UKMO/MF	62001	Buoy	-5	45.3
UKMO/MF	62029	Buoy	-12.5	48.7
UKMO/MF	62052	Sea Level	-5.8	48.5
UKMO/MF	62081	Buoy	-13.3	50
UKMO/MF	62103	Buoy	-2.9	49.9
UKMO/MF	62105	Buoy	-12.6	55.4
UKMO/MF	62107	Buoy	-6.1	50.1

UKMO/MF	62163	Buoy	-8.5	47.5
UKMO/MF	62166	Buoy	1.5	59.5
UKMO/MF	62301	Buoy	-4.7	52.4
UKMO/MF	62303	Buoy	-5.1	51.6
UKMO/MF	62304	Buoy	1.8	51.1
UKMO/MF	62305	Buoy	0	50.4
UKMO/MF	64045	Buoy	-11.7	59.1
UKMO/MF	64046	Buoy	-4.9	60.6
Xunta Galicia	6201038	Buoy	-8.78	42.63
Xunta Galicia	6201039	Buoy	-8.66	42.29
Xunta Galicia	6201040	Buoy	-8.91	42.17
Xunta Galicia/MG/IM	AGuarda_buoy	Buoy	-8.9	41.9
Xunta Galicia/MG/IM	Cortegada_platform	Platform	-8.78	42.63
Xunta Galicia/MG/IM	Illas_Cies_buoy	Buoy	-8.91	42.17
Xunta Galicia/MG/IM	Rande_platform	Platform	-8.66	42.29
UniTuscia-CNR	Civitavecchia	Buoy	11.778	42.0828